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JUNE 1955



CHEMICAL PROCESSING®

At General Mills

'Bottom-up' Management Pays Off

CHARLES BELL'S Philosophy
Mirrored in Hustling
Chemical Division... page 27

General
Mills

5th ANNUAL...

CHEMICAL MATERIALS FEATURE

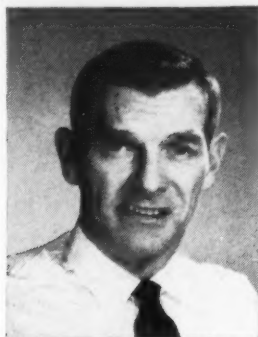
... page 31

Including CP's exclusive
chemical USE-INDEX

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TITLE	CODE No.
Boron Trifluoride, Compressed Gas.....	DA-34691
Boron Trifluoride, Compressed Gas Handling Information	TB-34691
Boron Fluoride Complexes with Nitrogenous Compounds..	DA-3469-NIT-1
Boron Fluoride Complexes with Oxygen- Containing Compounds	DA-3469-OXY-1
Boron Trifluoride, Ether Complex, Tech.....	DA-34711
Boron Trifluoride, Monoethylamine Complex, Tech.....	DA-34661
Boron Trifluoride, Phenol Complex, Tech.....	DA-34681

New book on Boron Fluoride

The most extensive study of boron fluoride to date is contained in a new book, "Boron Fluoride and its compounds as catalysts in organic chemistry," written by A. V. Topchiev, S. V. Zavgorodnii and Y. M. Paushkin. It discusses the use of boron fluoride as a catalyst in organic chemistry and also its derivatives and molecular compounds. Contents include physical and chemical properties; co-ordination compounds; compounds of boron fluoride in alkylation, polymerization, isomerization, cyclization, nitration and sulphonation reactions; condensation reactions in the presence of boron fluoride; and many other topics.

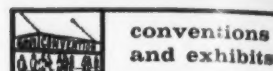
This book (price, \$12) is published by Pergamon Press, Inc., 122 East 55th St., New York 22, N. Y.

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GENERAL CHEMICAL DIVISION

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June 1-5. Fifth World Petroleum Congress Exposition, Coliseum, New York City.

June 2-4. Appalachian Underground Corrosion Short Course, University of West Virginia, Morgantown, West Virginia.

June 9-12. The Material Handling Institute's Exposition of 1959, Public Auditorium, Cleveland.

June 10-12. Instrument Society of America, Second International Symposium on Gas Chromatography, Kellogg Center for Continuing Education, E. Lansing, Michigan.

June 11-13. Manufacturing Chemists Association, 87th Annual Meeting, The Greenbrier, White Sulphur Springs, West Virginia.

June 15-19. Course on the Theory and Design of Biological Waste Treatment, Civil Engineering Dept., Manhattan College, Riverdale, New York.

June 22-24. American Society of Refrigerating Engineers, Annual Meeting, Lake Placid Club, Lake Placid, N. Y.

June 22-26. Gordon Research Conference, Chemistry of Coal, New Hampton School, New Hampton, N. H.

June 24-26. Instrument Society of America, Nuclear Instrumentation Symposium, Idaho Falls, Idaho.

June 29-July 3. Gordon Research Conference, Nuclear Chemistry, Kimball Union Academy, Meriden, N. H.

June 29-July 3. Gordon Research Conference, Catalysis, Colby Junior College, New London, N. H.

July 6-10. Gordon Research Conference, Polymers, Colby Junior College, New London, N. H.

July 13-17. Gordon Research Conference, Organic Reactions and Processes, New Hampton School, New Hampton, N. H.

... Meetings and shows of interest to the chemical industries

July 27-31. Gordon Research Conference, Chemistry at Interfaces, Kimball Union Academy, Meriden, N. H.

August 10-14. Gordon Research Conference, Elastomers, Colby Junior College, New London, N. H.

August 18-21. Western Electronic Show and Convention, Industrial Design Competition, Cow Palace, San Francisco.

September 13-18. American Chemical Society, National Meeting, Atlantic City.

September 21-25. 14th Annual Instrument-Automation Conference and Exhibit, International Amphitheatre, Chicago.

September 27-30. American Institute of Chemical Engineers, St. Paul, Minnesota.

September 28-30. American Oil Chemists' Society, Hotel Statler, Los Angeles.

October 7-9. American Vacuum Society, Sixth National Symposium on Vacuum Technology, Sheraton Hotel, Philadelphia.

October 18-22. The Electrochemical Society, Inc., Deshler-Hilton Hotel, Columbus, Ohio.

October 20-24. Federation of Paint and Varnish Production Clubs, 37th Annual Meeting and the 24th Paint Industries' Show, Convention Hall, Atlantic City.

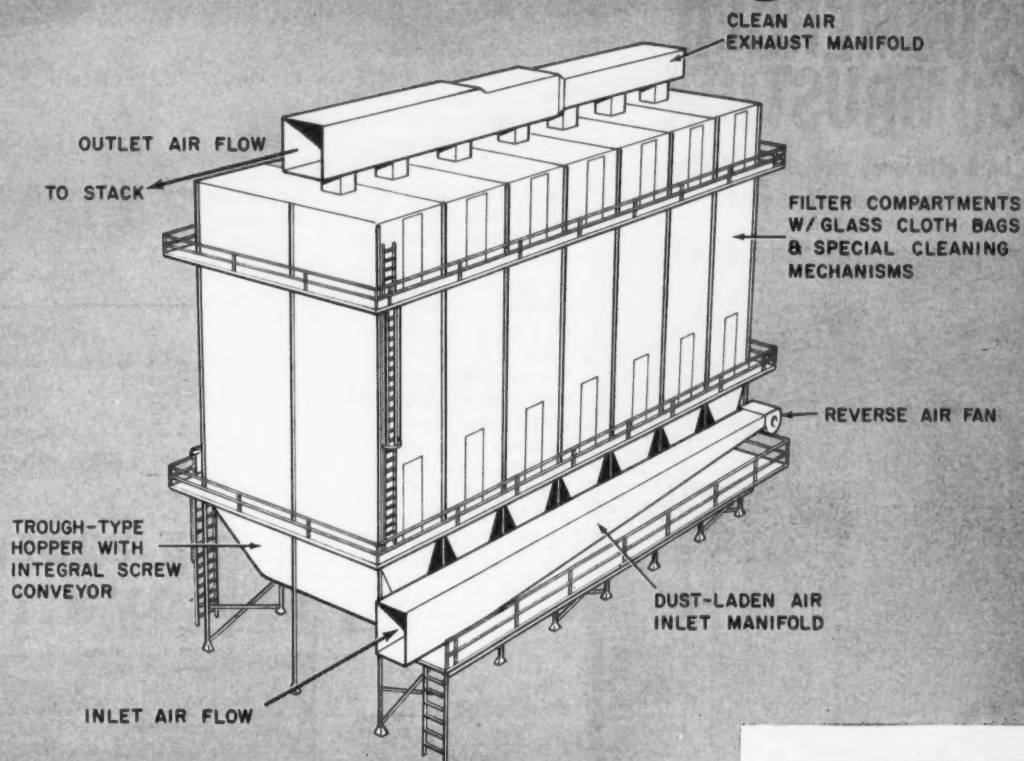
November 2-5. 11th Exposition of the Air-Conditioning and Refrigeration Industry, Convention Hall, Atlantic City.

November 2-6. National Metal Exposition, Chicago.

November 16-20. Fifth International Automation Congress and Exposition, New York Trade Show Building, New York City.

November 30 - December 4. 1959 Exposition of Chemical Industry, Coliseum, New York City.

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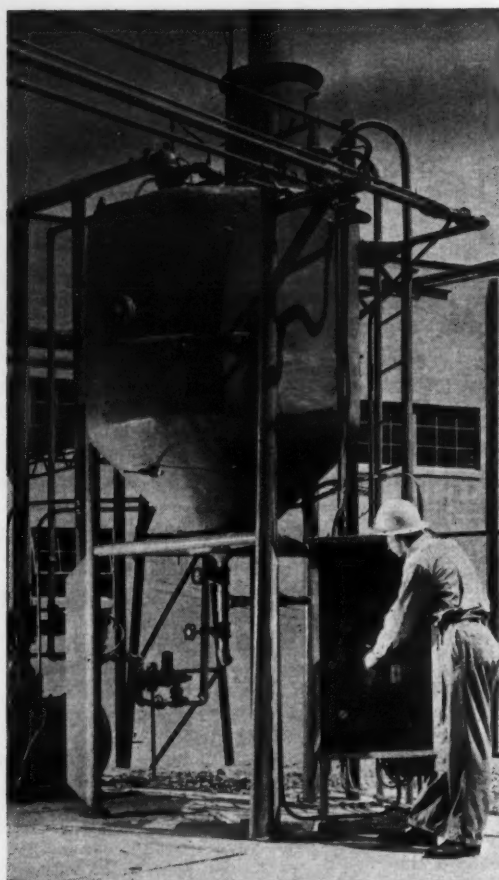
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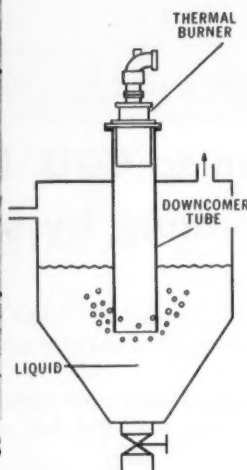
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and Chemical Business

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Vol. 22

June 1959

No. 6

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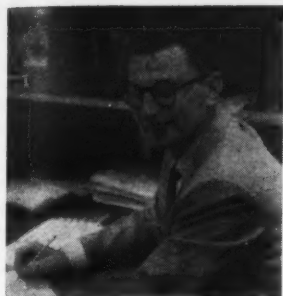


CHEMICAL PROCESSING

Check 2093 opposite last page



over the editor's
shoulder



Your next new raw material?

Perhaps you remember CHEMICAL PROCESSING's exclusive panel report on "Cutting Test Tube to Tank Car Time" (August 1958, page 45). Two important points were brought to light in this report. The first was the necessity from a potential customer's standpoint of knowing the suggested or potential use for a new compound. The second, knowing that it was actually available as more than a laboratory item.

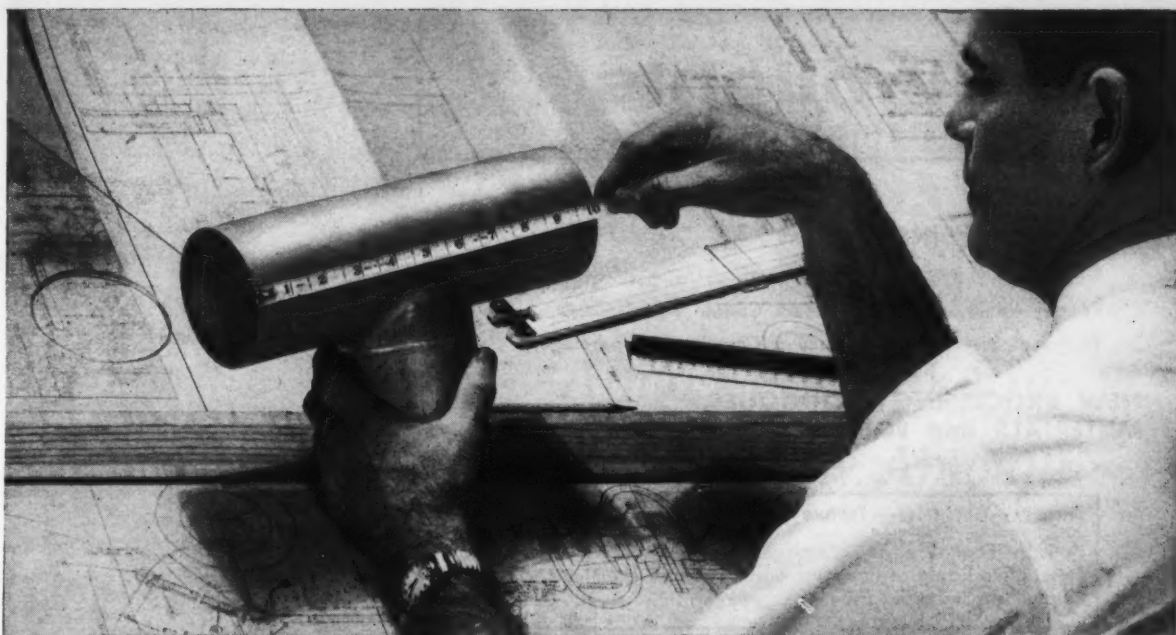
This month, for the fifth consecutive year, we are featuring the Chemical Materials Section of CP. As our contribution to a shorter test tube to tank car time, a highlight of this year's feature is a listing of over 350 new products introduced on a developmental scale during the past year.

Here is an opportunity to locate new compounds now available on a pilot plant or semi-works scale, products that can be shifted to full-scale production . . . not merely laboratory oddities. And to make it even easier to pinpoint those items of interest you'll find CP's exclusive chemical Use-Index on page 32. You can find out quickly not only what is available but, by using the Use-Index, where it might best be used.

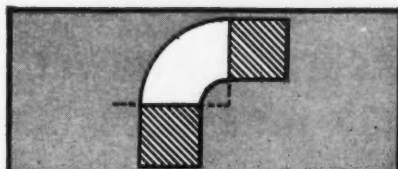
How do other companies evaluate new products such as these? We asked Dr. George Rigby of Du Pont to tell CP's readers how his company handles this job. You'll find his report and the beginning of this year's Chemical Materials Feature on page 31.

Shirley H. Pelt

Associate Editor



SAVINGS ARE MEASURABLE...START TO FINISH WITH LONGER LENGTH SPEEDLINE FITTINGS



HERE'S HOW YOU CAN CUT PIPING COSTS

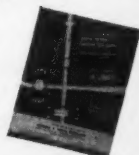
A conventional 90° elbow is shown inside the dotted line. The shaded areas indicate the extra length you get with a Speedline fitting—at no extra cost. For example, on a 3" Speedline Elbow it means 4" more pipe. Thanks to the longer length of all Speedline fittings, all types of joints are made more easily . . . cost less . . . than with conventional fittings. Make your own comparisons.

For location of Authorized Distributor nearest you, see Speedline listing on page 593 in Chemical Engineering Catalog.

With this 3" Speedline Tee you get 3 1/4" "more length" at no extra cost. Speedline's *tangential feature* cuts costs and design detailing, too . . . lets you select the best joint to meet assembly requirements . . . means more clearance for welding and easier pipe aligning. Flange where you want to, weld where you want to . . . any type joint can be used on any or all ends of a Speedline corrosion resistant fitting!

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Before you plan any new installation or system addition, investigate the many advantages of Speedline's *tangential feature*. Write for Speedline Catalog showing how you save with the complete line of Speedline fittings.

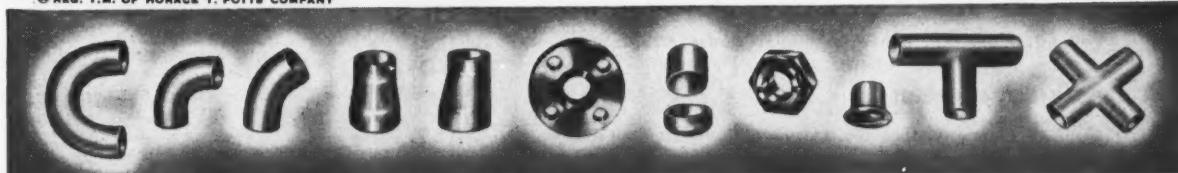


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Check 2094 opposite last page

highlights

**CHEMICAL
PROCESSING**

JUNE 1959

VOLUME 22 • NUMBER 6

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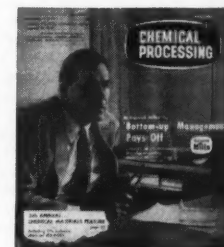
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THIS MONTH'S COVER

General Mills' dynamic "bottom-up" management policy is exemplified in its dynamic president, Charles H. Bell, shown here at his desk. Bell's philosophy that the "responsibility for performing managerial duties is decentralized and delegated as far as possible" is personified in the operation of the firm's Chemical Division.



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SPECIAL READER SERVICES

• For more information on articles and advertisements in this issue, check the Reader Service slip opposite last page

• To subscribe to this magazine see reader-qualification form opposite last page



letters from readers

Calls buying from Russia doing business with Devil

The section containing comments on the importation of Iron Curtain aromatics was on the press when the Belton letter was received. Because of the timely comments expressed therein on this controversial subject (February CP, page 25) the editors felt these views should be brought to the attention of readers as quickly as possible. The other letters, which arrived earlier, are on page 29.

Dear Sir:

I would like to take issue with the basic premise on which Mr. O. V. Tracy based his article entitled "Iron Curtain Aromatics—A Long-Range Problem." In his second paragraph he states "Russia and its satellites do not appear to be motivated by political reason; rather they, like so many other countries abroad, have a 'pressing desire' for American dollars."

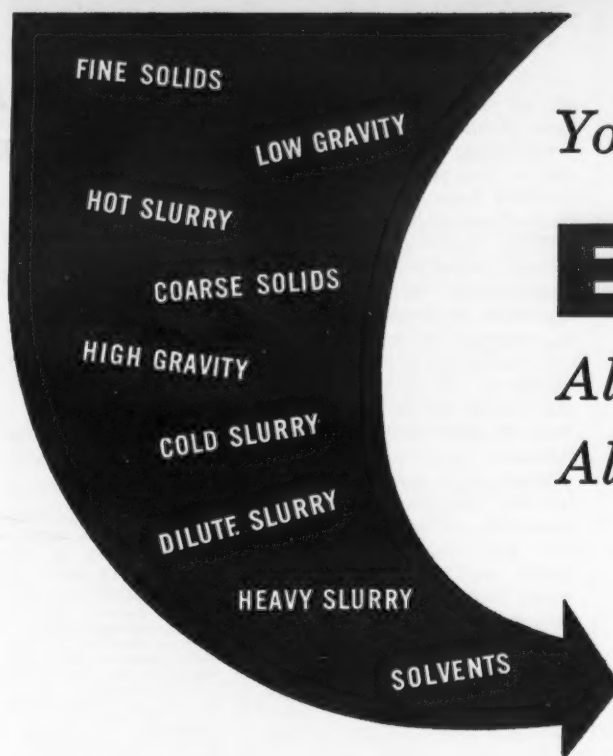
Mr. Tracy may have "eminent qualifications to speak on the inroads Russian-imported aromatic hydrocarbons are making on the U. S. market." However, I think he is just plain naive on the evaluation of the diabolical ideology which Russia and its satellites represent.

Currently, the free nations of the world are engaged in an economic battle with the Iron Curtain countries. Communists practice "free trade" only so long as it has a place in the long-range planning of Communism—which is world domination.

Cites Two Reasons

Temporarily, the Russians have two reasons; first, they must figure that they could not presently win an all-out war, otherwise the war would now be in progress; second, if it is cheaper and easier to conquer other nations by undermining their economic stability, this is the preferred means to the same end—world domination!

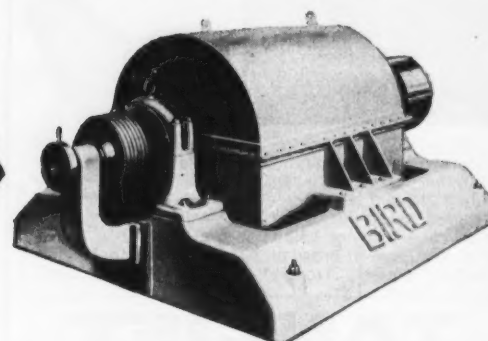
As long as Russia can convince such eminent businessmen as Mr. Tracy that they are "not motivated by political reasons," the free nations already have two strikes



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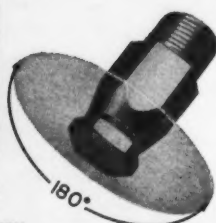
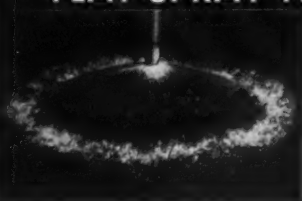
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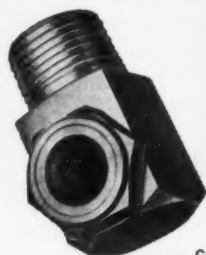
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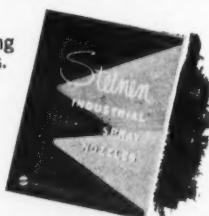


Non-clogging nozzles having a uniform solid-cone spray pattern, furnished in brass, steel, 303 stainless or other suitable materials for any application or process which involves spraying of fluids. Sizes $\frac{1}{4}$ " — $\frac{3}{8}$ " — $\frac{1}{2}$ " male or female conn.

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Check 2096 opposite last page

LETTERS

against them: Free nations have swallowed the Russian propaganda, and the attention of free nations has been diverted from the true long-range Communist objectives.

When dealing with an amoral nation or person we must accept their basis for argument. A Russian promise or contract is worthless by our standards. Therefore, it is necessary to abandon logic and morals as we understand them in order to argue against them.

There are several reasons for the "pressing desire" for American dollars, e.g. they can buy our manufactured goods and then reproduce them, thus saving time, effort, and money on design technology and on patent obligations. But first and foremost is their desire to use our dollars to undermine our system of government and our way of life and to enslave each and every one of us.

Minimum Standards

In our capitalistic economic structure, a minimum of government intervention in business is desired. It is therefore contrary to this desire to expect our federal government to legislate morals. Our laws establish only the minimum standards—for instance, it is not obligatory to drive at 60 mph on a highway, nor would it be wise during rain or fog.

To buy anything from Russia is to do business with the Devil. To make a dollar by doing business with Russia is to sell your soul to the Devil. The board of directors of each company has an obligation to try to earn money for the stockholders. The stockholders assume that the board of directors will perform in their continued best interest, not in just making a dollar for today but also by preserving our way of life in the future. No stockholder wants to earn blood money, especially when it is his own blood that may be smeared on the dollars.

I disagree rather violently with Mr. Tracy and believe that he is underestimating Russia by thinking that any action by them is not "politically motivated."

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Write for Bulletin HF-958 which gives full details.



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IT'S a fact that hundreds of reciprocating pump and cylinder users today are standardizing on Darcova Pumcups because they eliminate fluid slippage, costly down-time and maintenance!

It's easy to check these claims right in your own plant. Behind this exceptional Darcova Pumcup performance lies texture-engineering and cup design that conform precisely to pressure-temperature-fluid conditions.



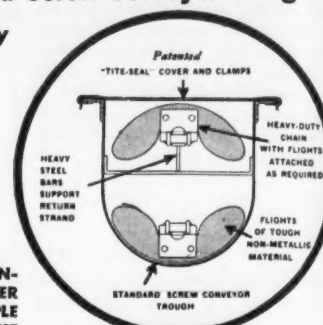
DARLING VALVE & MANUFACTURING CO.
Williamsport 4, Pa.

TRADE MARK

Pumcups

Check 2098 opposite last page

CHEMICAL PROCESSING



CROSS SECTION



Cross-section of the conventional and 45° bevel type Pumcups

Pumcups of various types are available in a complete range of sizes and texture-engineered compositions for your reciprocating pump and cylinder requirements.

Why not get all the facts? Send today for Pumcup Bulletin No. 5503.

LETTERS

I also believe that reputable businesses should not trade with Russia. The deterrent from this practice should, however, not originate in government regulations. It should emanate from the consciences of men, the reprimands of the stockholders they represent and/or their disgusted customers.

CAROL E. BELTON

Likes Hartley article

Dear Sir:

I read Mr. Hartley's article on fighting for "Right to Work" laws in the March issue (page 29) with interest and enthusiasm. He referred to a "National Right to Work Committee." Would you please send me the address of this organization so that I may find a way to participate in this effort?

O. H. VALENTINE

Engineering Manager
Special Products Division

Ethicon, Inc.

(Editor's Note: For others who might be interested in writing to the National Right to Work Committee, the address is 1025 Connecticut Ave., N. W., Washington 6, District of Columbia.)

Backs Hartley's stand

Dear Editor:

I am in whole-hearted accord with the title of ex-Representative Hartley's article in your March issue. No able-bodied adult who wants to work should be without a job. The right-to-work is deeply American, and should be guaranteed and protected by law.

It is a welcome change from the battle-scarred days of the '30's, and a refreshing sign of the times to see an employer's spokesman advancing a workingman's slogan, "Fight for the Right to Work," and urging employers to engage in political action to suit the deed to the purpose.

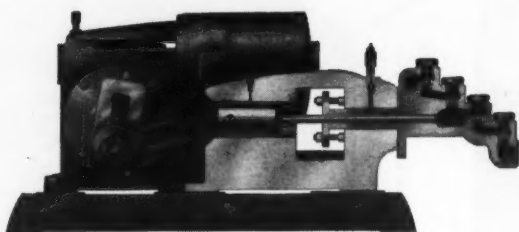
I further agree with Mr.

HOW TO METER SLURRIES ACCURATELY

Few pumping jobs present more complex problems than the accurate metering of slurries. Since they are often abrasive, slurries can make the selection of pump parts extremely difficult. Minute particles settling out in the packing can score a plunger beyond usefulness in minutes. And viscous, tacky slurries can limit ball check freedom and reduce accuracy. But even the toughest slurries can be metered accurately . . . by adhering to good slurry handling practice, and by choosing the right pump for the job.

Keep Slurries In Suspension

Several practices that have proved valuable in this difficult service are aimed at keeping the solids in suspension. Suction and discharge lines should be as short as possible. The supply tank should always be well agitated. And if packed plunger pumps are used, stroking speed should be held between 45 and 75 rpm to minimize settling.



Standard Motor Driven Controlled Volume Pump

Choosing The Right Pump

Controlled volume pumps are manufactured in a sufficient variety of designs to provide a full range of desired characteristics for slurry service. An economy pump such as Milton Roy's H20® can handle slurries up to 5% by weight. Standard motor driven pumps, with minor modification, can handle much denser slurries. And the new ODS (Oliver Diaphragm Slurry*) controlled volume pump can easily manage slurries containing up to 60% solids by weight.

*Manufactured under exclusive license granted by Dorr-Oliver Inc.

If precision metering of slurries is one of your problems, look again to Milton Roy's 25 years of experience for your most economical solutions. Write for a general introduction to controlled volume pumping given in Catalog 553-1, Milton Roy Company, 1300 East Mermaid Lane, Phila. 18, Pa.

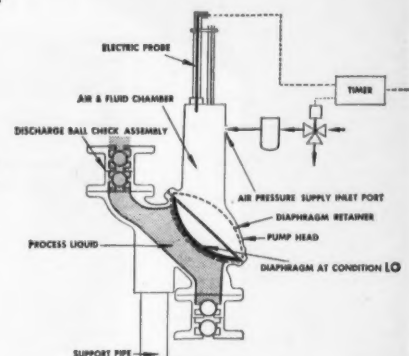
Controlled Volume Pumps • Quantichem Analyzers • Chemical Feed Systems

Packed Plunger Pumps

Because the entire liquid end of a packed plunger pump is in intimate contact with the slurry, considerable attention must be paid to materials selection. Ball checks and plunger should be as hard as possible, and seats should be relatively soft. Balls are usually made of Hastelloy D, 440 stainless, or ceramic, while 316 stainless is standard for the seats. The plunger must be extremely hard, and high strength sintered alumina is generally recommended.

Proper packing maintenance in slurry service demands that packing be flushed out continuously. An internal flush, continuously bleeding a small amount of liquid along the plunger, is the most common. Dangerous liquids may require an external flush arrangement. Liquid is continuously fed in on one side of the lantern ring, drawn around the plunger, and carried away from the other side.

The ODS Controlled Volume Pump



Capable of pumping 180 gph of the densest slurries at accuracies of $\pm 2\%$ against pressures up to 90 psi, the ODS has no plunger, no packing. It is based on the Oliver Diaphragm Slurry pump design principle which consists of two opposed chambers separated by a slack diaphragm. A three-way solenoid alternately pressurizes and bleeds air from the upper chamber. With the upper chamber at atmospheric pressure, the suction head forces slurry into the lower chamber. Then, when the upper chamber is pressurized, the diaphragm forces the slurry out through the specially designed ball check valves.

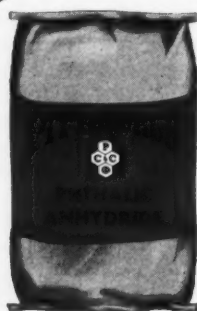
Problem Slurries

Yes, slurries can be metered accurately. And the best proof of this claim is the thousand or more Milton Roy pumps successfully metering slurries in the field. The list includes such problem liquids as an 80% coal slurry, a 45% suspension of lead peroxide in butyl phthalate, 15 to 20% diatomaceous earth slurries, finely divided nickel catalytic suspensions, gold ore slurries, and even a 55% by weight powdered aluminum suspension. Some of these materials are so thick that they can support the weight of a screwdriver.



Check 2099 opposite last page

It pays to buy
ALL THREE
from
P.C.&C.



MAKE Pittsburgh Coke & Chemical your "one source" supply of phthalic, maleic and fumaric . . . and realize immediate savings in *time* and *money*. A single purchase order simplifies your paper work. Mixed carload shipments reduce transportation costs and permit tighter inventory control.

Buy "all three" from Pittsburgh Coke and you deal with one efficient, coordinated sales and service team, familiar with your operations and requirements.

But, most important of all, enjoy the confidence of doing business with a *basic* producer of uniform, high-purity materials, backed by alert, responsive sales and technical service. If your 1959 production calls for phthalic anhydride, maleic anhydride or fumaric acid, write to Pittsburgh Coke *today* for samples and specification sheets.



WSW 7459

COAL CHEMICALS • PLASTICIZERS • PROTECTIVE COATINGS • ACTIVATED CARBON • CEMENT • COKE • PIG IRON • FERROMANGANESE

Check 2100 opposite last page

LETTERS

Hartley's proposition that there should be no forced riders in a unionized plant. When a union bargains for and achieves a wage increase, shorter work week, more vacation time with pay, or better shop conditions, non-union workers being outside the bargaining unit and thus not having been bargained for, should step up and demand the right not to receive any of the benefits won by the union. Only in this way can the non-union worker demonstrate his idealism and protect his integrity and individualism, his most treasured possessions.

CLARK WENTWORTH
Chicago, Ill.

Rebuttal to Harris

Dear Sir:

Everybody is, of course, entitled to give his opinion and I would not care to answer if the problem would not be too serious to be handled with "catchwords" like "curtailing free enterprise," "extending socialism" or "free enterprise suicide."

It is not the right place and the right time to play around with such words. It is only to be hoped that the readers of your magazine are well-trained in reading letters to the editor.

Mr. Harris (Letters From Readers May CP, page 7) makes a mistake if he thinks that there is a clear-cut distinction between basic and applied research. I am not suggesting to give the universities all results of industry a tout prix, but if the universities should wait for some results until they are published, a great deal of time is passed.

Another mistake leads to the assumption that we should have universities in all types of manufacturing business. This is not the logical consequence of using the progress of basic and applied research in the curricula of universities to give the academic engineers the general education needed for preparation of engineers for industry.

George Gibson, Montclair,

CAMBRIDGE GAS ANALYZERS



COMBINATION DISSOLVED OXYGEN AND DISSOLVED HYDROGEN ANALYZER, for continuously and simultaneously recording the oxygen dissolved in boiler feedwater and the hydrogen in steam condensate. Bulletin 101

COMBINATION OXYGEN, CARBON-DIOXIDE, AND COMBUSTIBLES ANALYZER, for cement lime, bauxite, sintering and other types of kilns. Bulletin 102

CARBON DIOXIDE, HYDROGEN, CARBON MONOXIDE ANALYZER-RECORDER, for blast furnace top gases and for gas generator analysis. Bulletin 103

HYDRAZINE ANALYZER for Indicating and Recording N_2H_4 in boiler feedwater. Bulletin 104

SULPHUR DIOXIDE ANALYZER, explosion proofed for hydroformer application; controllers for acid plants. Bulletin 105

GAS ANALYZERS, single and multi-point for boiler flue gas. Bulletin 106

PORTABLE pH METERS, for laboratory, plant and chemical processes. Bulletin 107

SINGLE AND MULTI-POINT pH INDICATORS, RECORDERS AND CONTROLLERS. Bulletin 108

Send for any of the above bulletins.

CAMBRIDGE INSTRUMENT COMPANY, INC.

3541 Grand Central Terminal, New York 17, N. Y.

PIONEER MANUFACTURERS OF PRECISION INSTRUMENTS

Check 2101 opposite last page



Corrosive wastes are handled in UPVC (unplasticized polyvinyl chloride) piping at the boric acid plant of Stauffer Chemical Company, San Francisco. Equipped with *htp* drainage fittings.

To help you on UPVC piping

We have developed valuable data to help you design for UPVC piping to stop corrosion...available in *htp* Catalog 119, free on request. Also gives complete specifications on *htp* fittings, flanges, valves and specialties.



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Louisville 11, Kentucky

Check 2102 opposite last page

LETTERS

N. J., wrote recently in another publication, with reference to research and teaching: "... In the past, much of our basic information has been the result of European research. Financial and other limitations may restrict this source in the future. It is time that adequate support be given basic research in the country. I suggest that the ACS might properly support such programs. Voluntary contributions from members and industry could be solicited and the fund managed by a voluntary panel of leading chemists ..."

I agree full-heartedly if the panel members keep the university free from using "oriented thinking." I am sure that such letters like the one from Mr. Harris will not stop the progress in our teaching in the universities, and will not prevent at the same time the freedom of thinking at the academic institutions.

Thank you for giving me the opportunity to answer the letter from Mr. Harris.

DR. ROBERT LOBSTEIN
Santa Monica, Calif.

Touche!

Dear Editor:

It was noticed in an article by Mr. A. J. Dragonette, (April CP, page 30) that he had a table showing several plastics including their specific gravities. Under this he had a specific gravity listed for cellulose acetate butyrate at 1.28. All our tests show that this specific gravity of cellulose acetate butyrate varies between approximately 1.18 and 1.20. This would bring the cost per cubic inch in cents down from 2.87 to 2.68.

We do not know where these figures on specific gravity were obtained, but feel that this error should be brought to your attention.

W. P. GIDEON

Manager, Plastics
Sales Development

Eastman Chemical Products,
Inc.

Kingsport, Tenn.

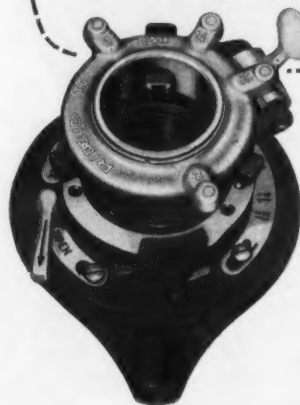
With these 3 **RIGID**

Jam-Proof Pipe Threaders

my power drive threading
is *Safe...*



...no watching to keep them from jamming
...save me a lot of time, too!



1" to 2" Pipe **RIGID** 65R-TC

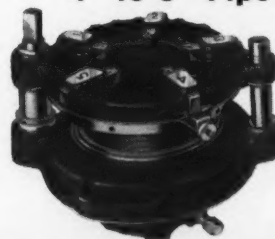
Jam-proof—can't jam if you forget it... Threads 4 sizes of pipe and conduit with 1 set of dies... True-Centering workholder—no more crooked threads—but adjustable for drip threads. Far more for your money—compare!

2½" to 4" Pipe **RIGID** 4PJ

Jam-proof... drive pinion kicks out automatically—real safety when power threading. Workholder sets to size before putting on pipe. Other exclusive advantages. Special 4PJ for conduit.



4" to 6" Pipe... **RIGID** 161



Jam-proof for safe power threading. 1 set of dies threads 4", 4½", 5" and 6" pipe and conduit—sets to size fast. Workholder sets to size before putting on pipe, a work-saver feature. Many other reasons why the 161 is your best buy!

See and try these popular **RIGID** Threaders... at your Supply House.



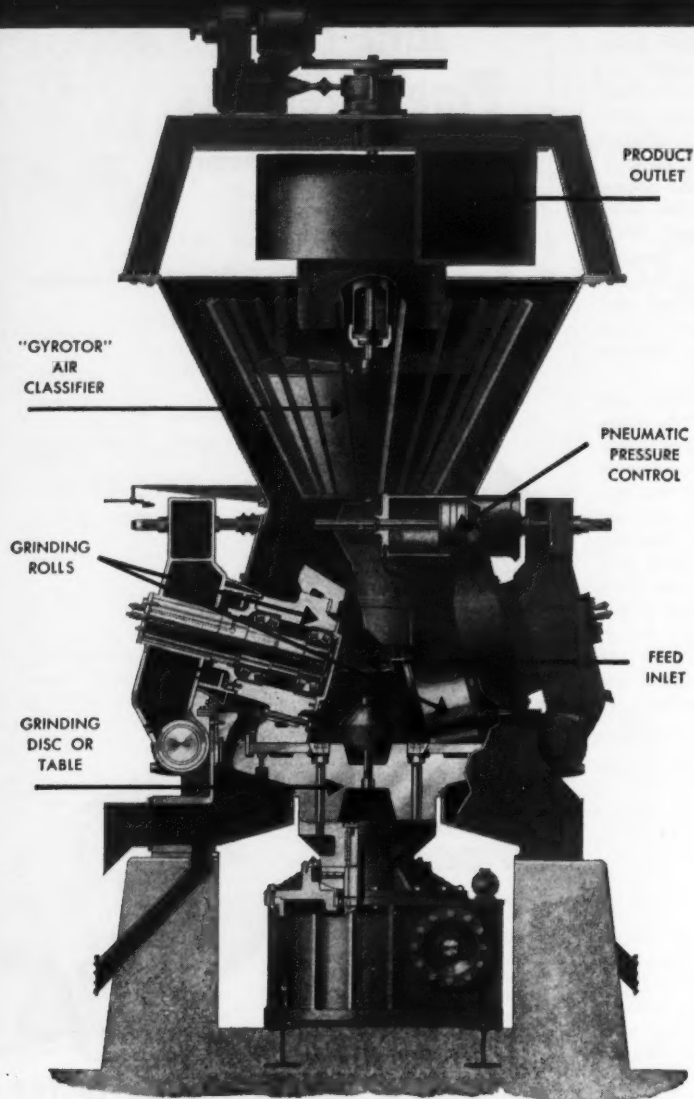
The Ridge Tool Company

Elyria, Ohio, U.S.A.

THREADED PIPE... It's Tight... It's Best... Costs Less!

Check 2103 opposite last page

DISC-ROLL MILL



The Hardinge Disc-Roll Mill is applied to dry grinding of minerals such as talc, limestone, coal, phosphate rock, bauxite, clays, celestite, and gypsum. The Disc-Roll Mill incorporates pneumatic roll-loading. Since the pressure on the rolls can be released or increased at will, complete flexibility of operation results. The problem of over-loading is eliminated. Also, the Hardinge "Gyrotor" Classifier is standard equipment on the Disc-Roll Mill. This classifier provides very close control of the finished product over a wide range of sizes. Ask for Bulletin 52-13

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Check 2104 opposite last page



Watching Washington

Fluorspar Import Quota Bill Poses Threat of Price Hike

Now pending in both houses of Congress—and brewing a storm on and off Capitol Hill—is proposed legislation to impose import quotas on fluorspar, which would mean higher prices for CPI users.

More than that, the bill (S.1285) is considered a "pilot" measure by senators of mining states who are seeking a formula for curbs on other metals and minerals, such as iron ore, copper, and manganese. The mining bloc also is out to tighten up last year's quotas on lead and zinc.

The fluorspar protection bill, introduced by Senator Gordon Allot (R., Colo.), would split the U. S. market between foreign and domestic producers by establishing a quota system.

In company with fluorspar users, the Interior, State, and Commerce Departments are opposing the bill. Royce Hardy, assistant secretary of the Interior, told Senate lawmakers such a quota system would result in an "economic strait jacket of price and production control." Creation of artificial scarcities and high prices is not the way to solve problems of domestic producers, he said.

If the fluorspar industry needs protection, the Administration takes the view that existing remedies should be exhausted before resorting to complicated quota measures. Escape clause provisions under the Tariff Act, as well as the national security provision of the Trade Agreements Act, were cited as steps that could be taken.

Plea Under Study

Under terms of the 1958 Trade Act, the Office of Civil and Defense Mobilization is empowered to investigate cases in which it appears the defense effort is being threatened by import competition. A petition from the fluorspar industry for import relief is under consideration by the OCDM.

Appearing in opposition to

the Allot bill on behalf of the "Fluorspar Consumers Committee" at Senate hearings was Charles W. Mitchell of Stauffer Chemical Company's Nyotex Chemicals Division. Other committee members are Du Pont, Alcoa, Harshaw, Dow, Pennsalt, Union Carbide, and Olin Mathieson.

As this group sees it, the bill's primary purpose is to subsidize domestic fluorspar production by fixing a price for U. S.-produced stocks and restricting foreign importations.

The legislation interferes with and restricts sources of supply on which domestic industry must depend, Mitchell told senators.

He pointed to the rising importance of fluorspar in the missile program and to diminishing domestic reserves. Some industry sources report that total domestic supplies will last no longer than 11 years—with little prospect for new discoveries.

"If we limit imports through the proposed quota system, we will curtail operations of existing foreign mines and will discourage further exploration and development of mines whose output will be very valuable to us in the future," Mitchell said.

Why Bill Is Opposed

Other reasons for opposing S. 1285 included in the Consumers Committee testimony were:

It would increase costs of production of many products without any corresponding

benefit to the rest of the economy; it is contrary to national security interests; it would endanger the reciprocal trade program; it is mostly in the interest of one domestic company.

The bill has the support of powerful Senate leaders, including Everett Dirksen (R., Ill.), minority leader, and Mike Mansfield (D., Mont.), assistant majority leader.

Observers here give the bill a fair chance in the Senate, but predict a tough time in the lower house. A more modified bill, which would set quotas on foreign imports only and leave domestic production alone, is given a better chance of passage. (The mining industry in general opposes allocation of production among domestic producers.)

Outdated color law hits coal-tar field

Coal-tar color manufacturers once again are feeling the stifling effects of an outdated color law.

The Food and Drug Administration has proposed removal of 17 more coal-tar colors, used principally in lipstick, from the approved list of colors for use in drugs and cosmetics that may be consumed internally.

Seven Test Harmful

Animal feeding tests showed that seven of the 17 colors caused injury to laboratory animals when fed in amounts making up 0.25 to 2.0 percent of the diet. The remaining 10 colors are closely related in their chemical structure to the seven tested.

While amounts of these colors that get into the digestive system are smaller than those used in tests, under the law as it now stands the FDA cannot set amounts of coal-tar colors to be used in foods, drugs, and cosmetics. It cannot list and certify to the safety of colors for un-

A significant new development in chemical mixing methods

The Smith Turbine Mixer is a remarkable new unit designed to give theoretical dispersion of particle size and ingredient to a wide range of dissimilar or disproportionate chemicals.

The Smith Turbine is a very high speed rotary mixer which actually propels the materials in a swift blending, braiding, folding action that mixes without mashing — coats without crushing. There are no wheels to "grind" ingredients or alter particle size—only efficiently shaped blades that provide intensive controlled turbulence without dead spots.

This high-speed action means high production from a small-sized mixer. Turbines are especially compact, require no special installation, and are so vibration-free they can be operated in close proximity to delicate laboratory instrumentation without disturbing it.

Smith Turbines are available in production sizes as large as 53 cu. ft. Capacity alone is a poor guide to performance, however, since the Turbine turns out batches so much faster than any other type of mixer. Sizes range down to the 2½ cu. ft. model — ideal for lab or pilot plant work . . . just right for forecasts and feasibility tests.

Incidentally, a wide range of mechanical modifications can be had to suit specific mixtures. If you've a knotty special problem, we'll be glad to work with you in developing a solution. Lab-size test equipment will be set up in your plant without obligation.

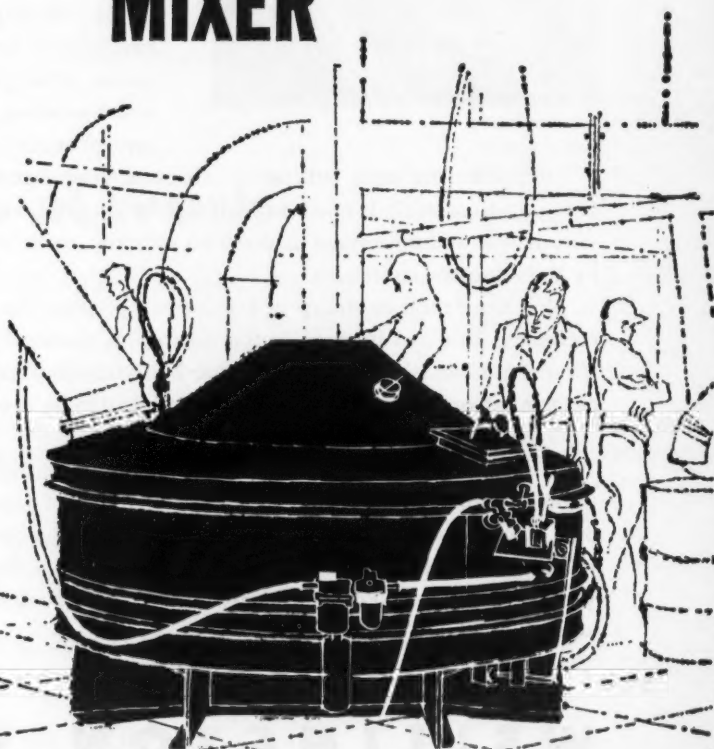
Impressed? Then investigate! A letter or phone call will bring quick action on additional information — or even a test demonstration *in your plant* using the very chemicals you mix! Fair enough? Then contact us today!

Ultra
High-Speed

Extra Thorough
Mixing

Unusually
Compact

THE SMITH TURBINE-TYPE MIXER



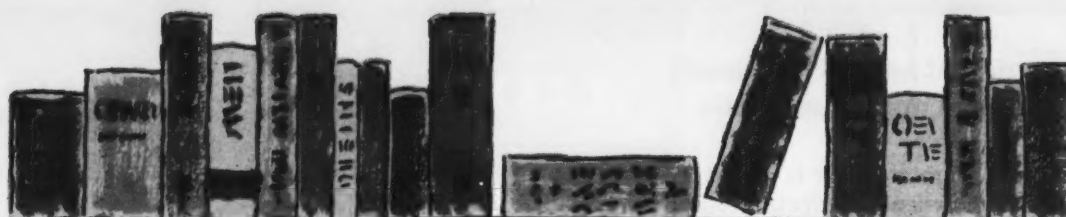
THE T. L. SMITH COMPANY

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AS-408B

Check 2105 opposite last page



TEXTILE TECHNOLOGY IN CHEMICAL ENGINEERING



Filter fabrics as major filter media

The ultimate effectiveness of any filtration operation depends on how well a filter medium does its job over a given period of time. That is, how efficiently a filtering surface blocks passage of solids while permitting liquid to flow freely, under existing conditions of pressure, temperature, chemical concentration.

Implied in the word "efficiently" are certain requirements related to the physical nature of the medium itself. It must last sufficiently long to make it economical, in terms of both material lost and down-time incurred for scraping, or for replacement or adjustment caused by shrinking and stretching.

No one fabric or group of fabrics can provide the proper medium for all filtration programs. This can be seen in the number of cases which showed, for instance, how a particular filter fabric performed best even though another was at first enthusiastically considered, or how a particular form of yarn had to be used solely because of the gasketing surfaces involved.

Today, with cotton, nylon, dynel, Orlon* and so many other textile fibers available, the filtration engineer has a wider choice of media—and a greater problem in selecting the right one. That is where we come in. The specialists who distribute Wellington Sears filter fabrics will be glad to help in every possible way, calling on both our fabrics and our hundred-some years of experience. For their names, and a handy book of information about filter fabrics, write Dept. M-6.

*Du Pont's trademark for its acrylic fiber

WELLINGTON SEARS

FIRST In Fabrics For Industry

WELLINGTON SEARS COMPANY, 111 WEST 40th STREET, NEW YORK 18, N. Y.
Atlanta • Boston • Chicago • Dallas • Detroit • Los Angeles • Philadelphia • San Francisco • St. Louis



Check 2106 opposite last page

WASHINGTON NEWS

restricted use unless they are found completely harmless.

An additional blow is being felt as the result of a proposed amendment to current coal-tar color regulations which would provide that when a color is removed from a permitted list, its use must be stopped simultaneously.

Until the proposed order, manufacturers could continue to use batches previously certified as safe (permitted colors) until they ran out.

There will be no reimbursement to manufacturers for the delisted inventory, and the burden will be on the manufacturer not to use the color.

Now ready for possible Congressional action is an FDA-proposed bill to cover all colors. It would permit the government to set tolerances on colors, or to specify products in which a particular color may be used, or both. The legislation parallels the food additive amendment.

Both industry and FDA are more anxious than ever for an all-inclusive tolerance-setting color law.

Antitrust group studies drug-makers' records

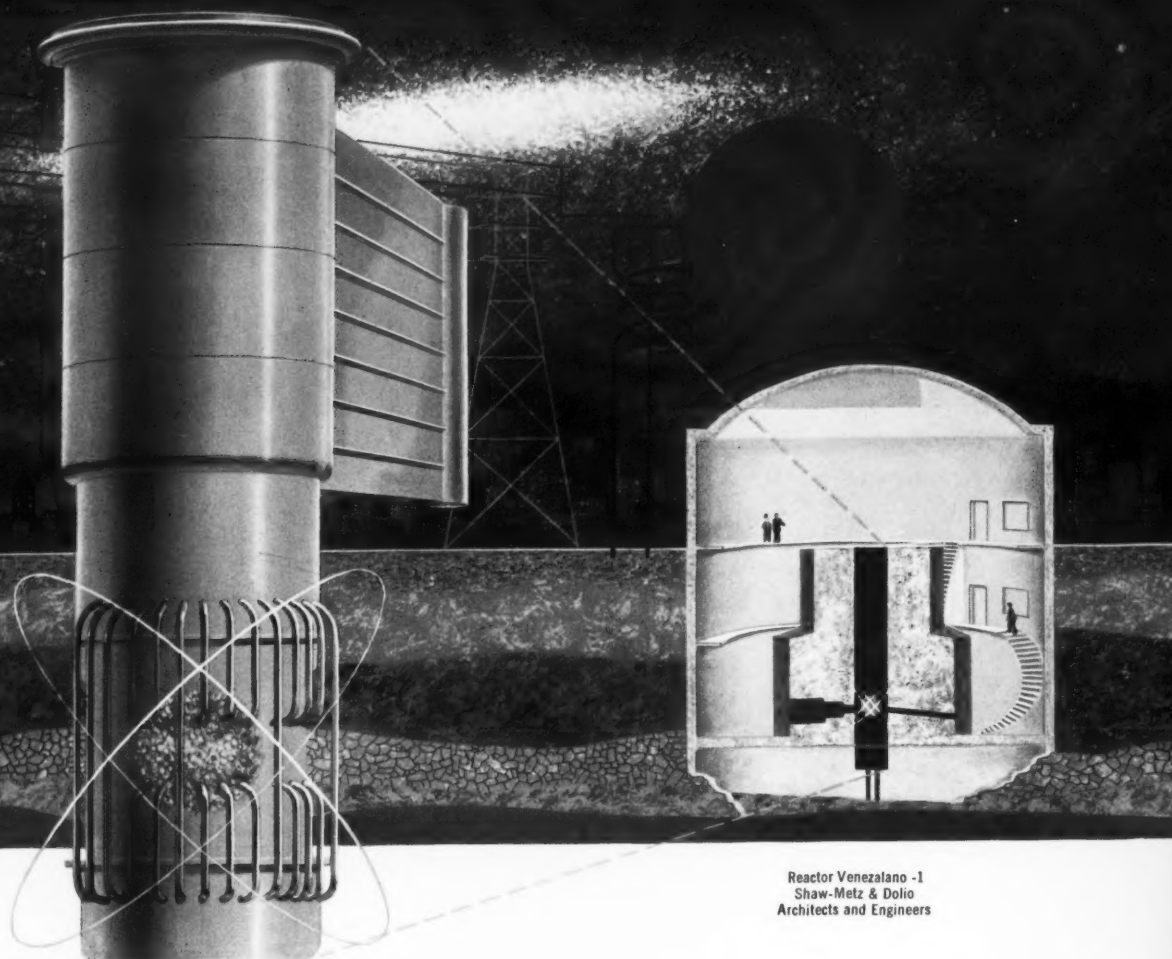
Now under study by the Senate Antitrust and Monopoly Subcommittee are records subpoenaed from 20 big drug manufacturers.

This is the latest step preparatory to hearings in which the subcommittee will charge the drug industry with price fixing. A committee spokesman told **CHEMICAL PROCESSING** that with the volume of work involved, hearings probably won't get under way until the end of the current session or later.

Also under consideration—but with a less certain plan of action, if any—are pricing practices in the fertilizer industry.

For more information on product at right, specify 2107... see information request blank opposite last page.



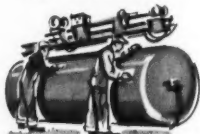


Reactor Venezalano -1
Shaw-Metz & Dolio
Architects and Engineers

Peaceful atoms at work



ENGINEERING



FABRICATION



FIELD ERECTION

A bright spot in the future of the peaceful atom is the type of nuclear power plant now appearing in this country and others.

Solar Chicago fabricated the pool liner for such a power plant recently. The pool liner—that's the vertical cylinder shown above—is used to contain radioactive material.

Whether it's a fabricated structure to help harness the atom, a pressure vessel for chemical or petroleum processing, or a new type of vessel to improve a brewery process, you can look to Solar Chicago for a superior design and fabricating job.

The next time you need process equipment of any type, give us a call. We'll meet the most rigid requirements for quality—the toughest delivery schedule.

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Inco-Weld "A" Electrode joins high-strength low-alloy steel and 304 stainless, in 45 ft by

12 ft diameter pressure chamber. Fabricated by O. G. Kelley and Co., Boston, Mass.

Inco-Weld "A" joins most dissimilar alloys in nuclear applications, too

The 4 welders above are all using Inco-Weld® "A" Electrode. They're welding high-strength low-alloy steel and 304 stainless on a 160-ton nuclear components testing chamber.

Two other popular electrodes failed on test welds for this job . . . weld metal cracked from differing thermal expansion rates between the dissimilar metals joined.

Inco-Weld "A" Electrode solved this problem . . . produced X-ray quality weld throughout; with corrosion resistance equal to parent metal.

Better than 97% of *all* weldable dissimilar alloys can be joined with both Inco-Weld "A" Electrode and Inco-Weld "A" Wire. You don't need any special equipment or training to get sound, strong, corrosion-resisting welds.

Useful new booklet "Now You Can Weld Dissimilar Alloys Quickly and Easily" includes actual cases of problem welds solved; costs reduced; with Inco-Weld "A" Electrode and Wire.

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THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N. Y.



**MIG or TIG-Weld
dissimilar alloy combinations
with Inco-Weld "A" Wire.**

You get all the advantages of Inco-Weld "A" Electrode plus an age-hardenable deposit. Available in spools and cut lengths.

INCO WELDING PRODUCTS

electrodes • wires • fluxes

Check 2108 opposite last page



Spotlight On People

Two new directors are elected at Victor Chemical Works—NELSON LOUD, managing partner of F. Eberstadt, New York investment bankers, and WILLIAM F. PRICE, partner in the Chicago law firm of Vedder, Price, Kaufman and Kammholz.

At Monsanto Chemical Company, 10 members of board are re-elected. They are EDGAR M. QUEENY, St. Louis, chairman; CHARLES ALLEN THOMAS, St. Louis; CHARLES S. CHESTON, Philadelphia; FREDERICK M. EATON, New York; JOHN L. GILLIS and CARROLL A. HOCHWALT, both of St. Louis; HERBERT HOOVER JR., Los Angeles; TRUMAN M. MARTIN, El Dorado; WILLIAM W. SCHNEIDER and FELIX N. WILLIAMS, both of St. Louis.

HAROLD W. HAIGHT is elected a director of Esso Research and Engineering Company. He is chairman of the board of Carter Oil Company.

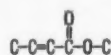
All officers of Hercules Powder Company are re-elected at annual reorganization meeting. They are ALBERT E. FORSTER, president and board chairman; WYLY M. BILLING, JOHN J. B. FULENWIDER, JOHN R. L. JOHNSON JR., PAUL MAYFIELD, EDWARD B. MORROW, vice president; J. H. TYLER MCCONNELL, secretary, and JOHN E. GOODMAN, treasurer. Re-elected to the executive committee are Messers Forster, chairman, Billing, Fulenwider, Johnson, Mayfield, and Morrow.

ROBERT W. HUFFMAN is elected president and general manager of Solventol Chemical Products, Inc., Detroit.

At Tennessee Products & Chemical Corporation, DONALD J. COLLINS is elected vice president for marketing, and RICHARD I. GOODKIND is elected vice president for administration. ROBERT C. HICKERSON is appointed chemical market development manager.

Four new vice presidents have been chosen at United Carbon Company. They are JOHN H. MCKENZIE, research and development; A. G. TREADGOLD, manufacturing; H. B. LAWSON, finance, and

Eastman Briefs FOR JUNE



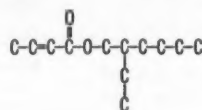
Methyl Crotonate

Form	liquid
Sp. Gr., 25°C	0.946
Boiling point, 760 mm.	118°C
Purity, %	99+

Here's a newly available ester with polymerization possibilities. With vinyl acetate, for instance, it produces a clear, solid copolymer when heated in the presence of benzoyl peroxide.

Eastman Chemical Products, Inc.
Kingsport, Tennessee

B5



2-Ethylhexyl Crotonate

Form	liquid
Sp. Gr., 22°C	0.882
Boiling point, 20 mm.	130°C
Purity, %	99+

With its conjugated double bond, this crotonic ester will get a rise out of those looking for new dienophiles for Diels-Alder reactions.

Eastman Chemical Products, Inc.
Kingsport, Tennessee

B6



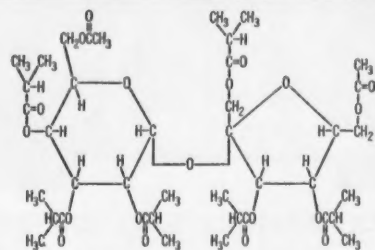
Methyl Isobutyrate

Form	liquid
Sp. Gr., 20°C	0.890
Boiling point, 760 mm.	92°C
Purity, %	99+

Organolepticians, people who smell—things, that is, report this ester has a fruity odor, suggesting its use as a bulk component of flavor essences.

Eastman Chemical Products, Inc.
Kingsport, Tennessee

B7



Sucrose Acetate Isobutyrate

In case you didn't receive an announcement, we have a healthy¹ new arrival at our place. Adhering strictly to family tradition we named this compact newcomer Sucrose Acetate Isobutyrate—SAIB, for short. Quite a mouthful, but then a perfectly clear young chemical² that empties a hot bottle in seconds³ and yet is spooned at room temperature⁴ deserves an impressive title.

We're not sure yet just what the future holds for our latest addition. Extremely stable character traits⁵ and early behavior patterns⁶ indicate a career in the coatings field. A smooth operator here, its ability to lower operating temperatures of hot melts, and increase the nonvolatile content of a lacquer without disturbing the viscosity or bothering film hardness might be a definite asset.

On the other hand we do not intend to limit young SAIB. We will continue to provide guidance and assistance, particularly during the early years; but anyone with opportunities who is interested in adoption should contact us immediately. We'll be more than glad to arrange an introduction and supply you with a complete case history.

¹ Molecular weight is 838.

² Maximum Gardner color is 2.

³ Viscosity is 90 Centipoises at 100°C.

⁴ Viscosity is 100,000 Centipoises at 30°C.

⁵ Resistant to heat and hydrolysis.

⁶ Compatible with most resins, oils and waxes.

Eastman Chemical Products, Inc.
Kingsport, Tennessee

B4

Chemicals Division
Eastman Chemical Products, Inc.
subsidiary of Eastman Kodak Company
Kingsport, Tennessee

FP

Please send more data on these chemicals:

B4 ☐ B5 ☐ B6 ☐ B7 ☐

Name

Title

Company

Address

Zone No.

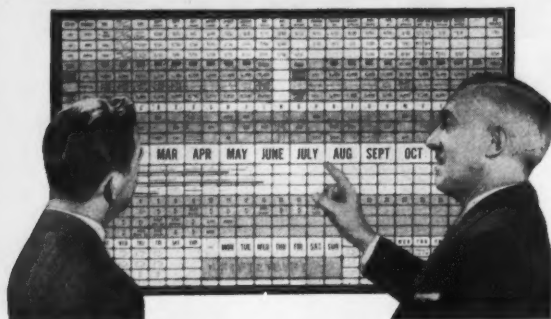
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CLIP AND FILE

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Check 2110 opposite last page

PROCESS DEVELOPMENT ENGINEERS

BS or MS in Chemical Engineering

Continued expansion in the synthetic fiber field by Celanese, an organization active in the 3 important fields of textiles, chemicals and plastics, has created new opportunities in the Development and Process Laboratories of the Fiber Division headquarters in Charlotte, North Carolina.

1. 4 to 5 years in synthetic fiber spinning and processing. To initiate and conduct engineering and development projects in specific fields; to develop and improve methods and equipment; supervise pilot plant operations; supervise and conduct tests and trials.

2. 3 to 5 years experience in process engineering. To plan and carry out complex phases of engineering and economic evaluation programs, including process design and evaluation on new and existing installations.

The Charlotte facility provides ideal working conditions. Promotional potential is excellent. Please send resumes, in confidence, to Mr. Robert Butts.

Celanese CORPORATION OF AMERICA

P. O. Box #1414, Charlotte 1, N. C.

Check 2111 opposite last page

PEOPLE

FRANK LINDEMAN JR., gas and oil.

DR. H. E. ROBINSON, SWIFT & Company's director of laboratories, is elected vice president in charge of the company's scientific research activities.

In a realignment of divisional responsibilities at S. B. Penick & Company, the following appointments are announced: BARCLAY E. MACKINNON to vice president in charge of the new NYQ Chemical Division; RUDY P. NEPTUN to vice president with special responsibilities in sales development and promotion; WILLIAM A. THAWLEY to director of sales coordination for the entire Penick organization, and JAMES J. VERDE to sales manager of the NYQ Chemical Division.

At Commercial Solvents Corporation, MAYNARD C. WHEELER is elected president; WILLIAM S. LEONHARDT is named financial vice president and treasurer, and JEREMIAH MILBANK JR. is elected chairman of the board of director's executive committee.

HERBERT E. MIEGEL is appointed to the newly created post of vice president-engineering, Reichhold Chemicals, Inc.

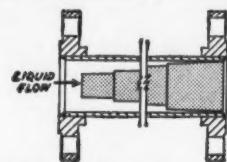
CHARLES O. PEYTON is named general manager of Esso Standard Oil Company's petroleum specialties department. He succeeds DONALD O. SWAN, who becomes vice president of Esso Export Corporation and general manager of Esso Export's cargo sales department.



NEW PIPING STRAINERS

Simplify removal of objectionable dirt from any piping system

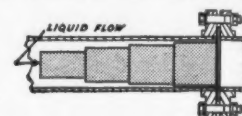
Elimination of objectionable dirt particles and other foreign matter from air, gas or liquid streams is accomplished effectively with Air-Maze Piping Strainers.



Installation of Air-Maze Piping Strainer in pipe strainer body.

For economy of installation, these strainers are mounted directly into any line using conventional Schedule 40 S pipe and Series 15 flanges. Cylindrical in design, the metal media

has multiple steps to provide maximum filtration area. Media in opening sizes .0013" to .0307" can be supplied. Maximum operating temperature 250°F. Maximum pressure drop 50 psi.



Installation of Air-Maze Piping Strainer in flange pipe.

Furnished with pipe strainer bodies, where required for nominal pipe sizes from 2" to 24".

Write Air-Maze Corporation, Department CP-6, Cleveland 28, Ohio.

Check 2112 opposite last page

SEAMLESS HIGH PRESSURE GAS CYLINDERS

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NEW BULLETIN ON
HIGH-PRESSURE
GAS CYLINDERS



Here's compact information to help you choose the right cylinders for all types of high-pressure gases—including oxygen, nitrogen, argon, ethylene and carbon dioxide. The bulletin tells why Hackney deep drawn, high-pressure gas cylinders save money on shipping charges, handling costs and maintenance. Gives complete data on styles, sizes, capacities and ICC specifications. Write today.



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Check 2113 opposite last page

CHEMICAL PROCESSING

Gulf Plans Oxo Alcohol Plant At Its Philadelphia Refinery

Gulf Oil Corporation announces construction will begin this summer on a multi-million dollar plant at its Philadelphia refinery for production of Oxo alcohols. Initial operations are scheduled to begin next summer. The facility will be the first major petrochemical installation at the Philadelphia refinery, and is the forerunner of other petrochemical installations.

It will quadruple Gulf's capacity to produce Oxo products. It is being built primarily to produce isooctyl and decyl alcohols. The plant also will be capable of producing a broader range of alcohols and other Oxo products.

Celanese Corporation of America has disclosed plans to enter the field of high-energy chemicals for missile propulsion systems.

The move was explained by a company spokesman as a "logical extension of the company's activities inasmuch as Celanese is basically a producer of polymers and of the synthetic organic chemicals from which they are made."

U. S. Industrial Chemicals Co., almost simultaneously with startup of a new polyethylene plant at Houston, announced the facility will be expanded to double its production.

Designed to produce 75 million lb annually of high-pressure polyethylene, it is expected to be operating at 150-million-lb capacity by the third quarter of 1960.

Combined with the 100-million-lb capacity of the plant at Tuscola, Ill., U. S. I. expects to be producing 250 million lb of high-pressure polyethylene by the end of 1960.

Cyanamid of Canada Limited is planning to convert its plant facilities at St. Jean, Quebec, to produce Formica laminated plastics. Cost of the project is estimated at \$1.5 million.

Present 17,000 sq ft floor space will be increased 50 percent in order to house new

machinery necessary for Formica production. Project is expected to be completed late in the first quarter of 1960.

Allied Chemical Corporation announces facilities for the production of phthalate ester plasticizers have been completed at the Toledo, Ohio, plant. The new plant will serve the Midwest by direct bulk and drum shipments.

Wyandotte Chemicals Corporation has completed work on the first half of a new plant at Geismar, La., which will produce 300 tons of chlorine and 330 tons of caustic soda annually. It is expected the entire plant will be completed later this year, at which time additional facilities will have been finished for production of 74 percent caustic liquor.

The company announced the ethylene oxide-glycol facility at Geismar, disabled by a fire and explosion last November 25, is back on stream.

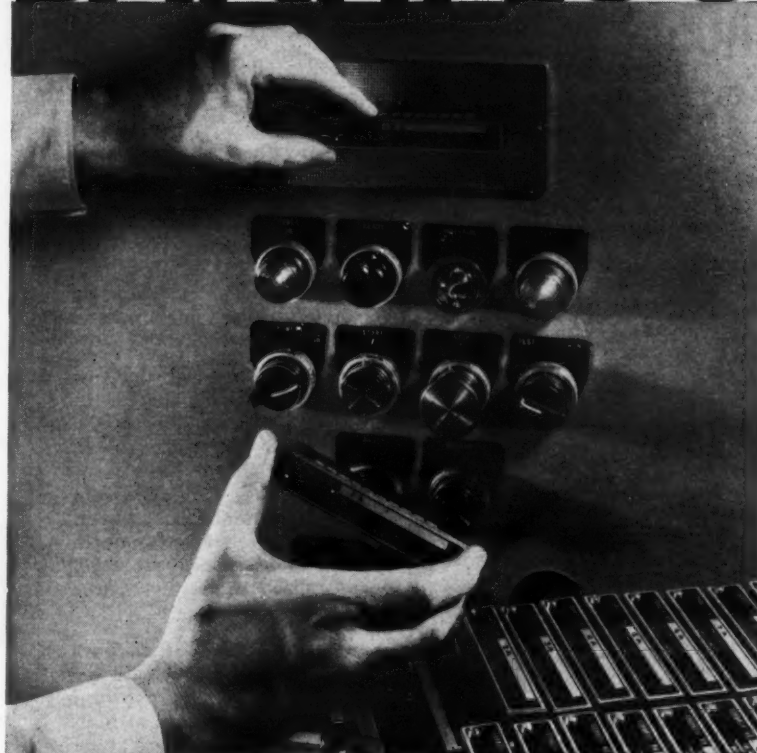
Air Reduction Sales Company, a division of Air Reduction Company, Inc., has completed a new oxygen and nitrogen plant at Denver. Stearns-Roger Manufacturing Co., Denver, was the contractor.

Air Reduction Chemical Company, also a division of Air Reduction Company, Inc., has opened a \$400,000 laboratory and engineering office building in the Bound Brook, N. J., area. An expansion of existing development facilities there, the new building now is the center for development of chemical processes and products, and for research on product applications.

National Aluminate Corporation's name has been

NEW LOW COST AUTOMATIC BATCHING WITH INSTANT FORMULA CHANGING

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#

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CHEMICAL BUSINESS

fourth investment by Union Carbide in European petrochemicals field. Another ethylene oxide and derivatives plant at Fawley, England, will begin production the last quarter of 1959.

Hooker Chemical Corporation has formed a Bahamian corporation, Hooker Chemical International Limited, to manufacture and market chemicals in Latin America.

The company also has formed a Mexican firm, Hooker Mexicana, S. A., to manufacture and market phosphates in Mexico.



nuclear notes

Significant news about atomic energy

Christening date set for N. S. Savannah

AEC has announced that the nuclear ship Savannah, world's first nuclear-powered merchant vessel, will be launched July 21, 1959. Mrs. Dwight D. Eisenhower will perform the christening ceremony.

Irradiated fuel tested with ultrasonics

Ultrasonics are being used to test irradiated fuel elements at Hanford Atomic plant. Fuel elements are placed on rollers under ten feet of water, then scanned as they are rotated. Instrument operates on pulse-echo principle, tests the bonding integrity between the core and cladding.

High-frequency energy is sent through water path and cladding for a short time duration (micro-seconds) followed by a pause and the echo generated by the pulse is picked up.

Reflected vibrations are transmitted above water where they appear as double

NOW YOU can produce PIGMENTED pre-polymer type POLYURETHANE COATINGS



PAST difficulties of pigmenting polyurethane pre-polymers can now be overcome. The Spencer Kellogg Laboratories have developed a practical method of pigmenting high-molecular-weight polyurethane pre-polymers. You can produce "high-service" polyurethane coatings in color, with excellent can stability, with excellent film integrity, in forms that can be conveniently used. Gassing and gelation in the container will be eliminated as well as pinholing in the film.

Higher gloss and better application properties will accompany improved viscosity stability.

This method specifically deals with Spenkels P18-50X and P93-80X—both urethane pre-polymers that exhibit high chemical and wear resistance. Spenkel P18 is very hard. Spenkel P93 is extremely flexible. Both are tough. *NOW* they can be pigmented.

SPENCER KELLOGG AND SONS
INCORPORATED
BUFFALO 5, N. Y.

WRITE FOR THIS BULLETIN. Spencer Kellogg and Sons, Inc. Technical Service Department have prepared a bulletin describing this new pigmentation method, showing it to be simple to apply and practicable for the average paint plant. Write for your copy and for the bulletins describing the Spencer Kellogg "Spenkel" polyurethane intermediates.

SPENCER KELLOGG AND SONS, INC.
BUFFALO 5, N. Y.

Please send me the bulletin on your "Slurry Grind" method of pigmenting polyurethane intermediates.

SPENCER SK KELLOGG

NAME _____ POSITION _____

COMPANY _____

STREET _____

CITY _____ STATE _____

Check 2118 opposite last page

Check 2119 opposite last page

NUCLEAR NOTES

echo on glass screen of an oscilloscope. If there is a fault between the aluminum wall and the uranium core, second echo becomes a jagged line on the screen. If there is no fault in the bonding, double echo appears as normal "pips" on screen.

Price list issued for nuclear materials

Price list for some of the nuclear reactor feed materials processed at its plant has been issued by Davison Chemical. The list is believed to be the first published by a private concern for such materials. Following are typical current prices per pound for uranium materials:

Natural uranium	\$ 24.00
Depleted uranium	4.85
Depleted oxide	3.30
1.6% enriched uranium metal	5.60
1.6% enriched uranium oxide	6.75
25% enriched metal	65.00
Highly enriched oxide	100.00

Prices for the first three materials cover outright sale. Other prices are conversion charges since only AEC can own enriched uranium.

(Further information about nuclear fuel products may be obtained from Davison Chemical Co., division of W. R. Grace & Co., P. O. Box 218, Erwin, Tenn.)

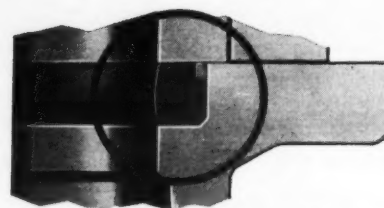
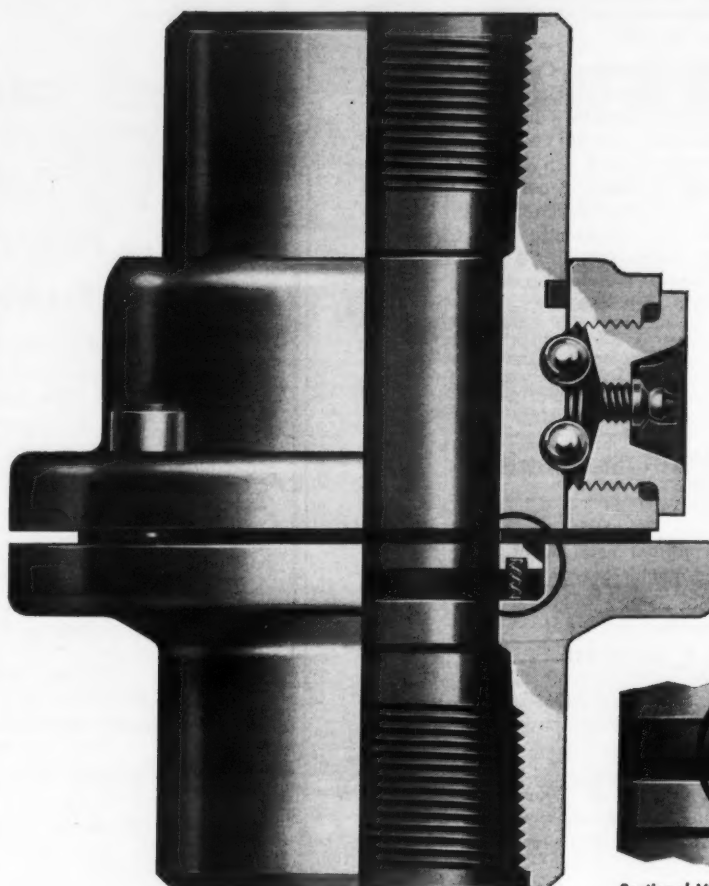
Check 2120 opposite last page.

Fuel recovery is routine at Savannah plant

Successful recovery of plutonium and uranium from spent nuclear fuel has been accomplished for the past four years by use of the Purex tributyl solvent extraction process at the Savannah River plant of E. I. du Pont de Nemours and Company.

As reported at the 1959 Nuclear Congress, process has demonstrated excellent continuity of operation, safety, and has given good yields at minimum cost. Spent fuel comes from the heavy-water moderated natural-uranium fueled reactors at the plant.

For Trouble-Free Flexibility on Steam, Hot Gas, Chemical Service Lines



Sectional View showing typical molded packing installed

For the engineer concerned with flex or rotational problems, on lines handling steam, hot gas or chemicals, the new DS swivel joints present a quick, effective solution. Versatile packing design permits use of either disc or molded types of packing to meet a wide number of services. Split segments allow replacement of packings within minutes and without removing joint from the line. And within the eight basic configurations of the new DS series joint are models to provide full 360° rotation in one, two or three planes. DS series swivel joints are recommended for chemical services ranging from -40° to +400°F and 300 psi. In steam rotation, the maximum is 440°F at 360 psi. For complete details on this remarkable series of Chiksan swivel joints, write today for your copy of Bulletin 1258.

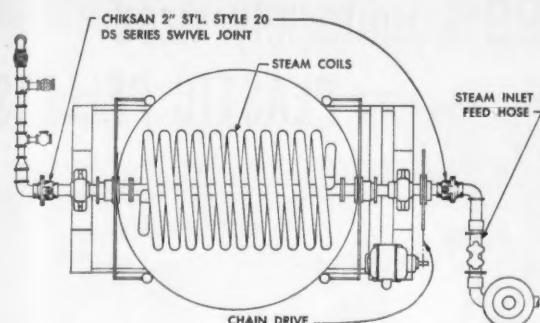
NEW CHIKSAN

DS

REPLACE SEALS WITH SWIVEL JOINT IN LINE

Allen-type screws secure the two sections of the DS series swivel joint. Screws are readily removed and seals replaced with joint in the line.





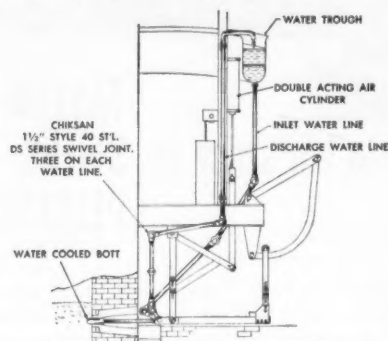
ROTATING STEAM COIL IMPROVES COOKING QUALITY, CUTS COSTS

Stationary steam coils in a large food processing plant were accumulating burned scale, reducing heat transfer by as much as 20% in a relatively short time.

Using Chiksan DS series swivel joints, the plant engineer designed a self-scouring rotating coil. Net results, this plant now gets closer flavor and quality control—also sustains heat-exchange efficiency—thus saving fuel.



For more details, request application report .009

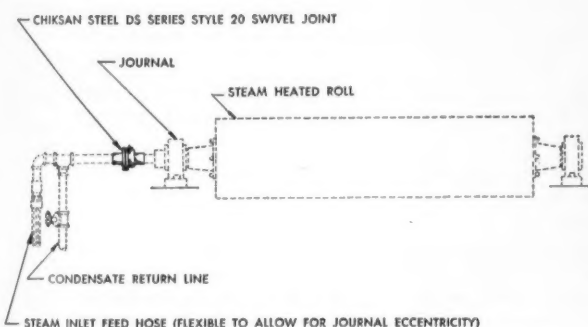


SWIVEL JOINTS HELP PULL THE PLUG ON MOLTEN SLAG

Pulling the water cooled bott permits removal of molten slag from blast furnaces. Proximity to the intense heat made rubber hoses out of the question. And even ordinary swivel joints weren't faring too well because packings would bake out in a day or two. New Chiksan DS series swivel joints deliver the solution, providing ten to twelve weeks of service before packing replacement is required.



For more details, request application report .014



STEAM STAYS ON THE BEAM WITH CHIKSAN SWIVEL JOINTS

To emboss plastic sheets, the material must be heated to a just-right degree of softness. A steam leak at the swivel joint connecting the stationary steam pipe to the revolving inlet means serious trouble. Previous tried devices were unsatisfactory. A DS series swivel joint was recommended. Present joint has been in service for better than four months with superior results. And when packing fatigue does occur, it can be quickly replaced with a minimum down time.



For more details, request application report .004

SWIVEL JOINTS SERIES



CHIKSAN COMPANY, 330 North Pomona Avenue, Brea, California
Please send me copy of Bulletin 1258.
Please send me product application report .004 ☐ .009 ☐ .014 ☐

Name

Company Title

Address

City Zone State

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Check 2121 opposite last page

Plastics, rubber research aided by radiation unit

Radiation unit has been purchased by Shell Chemical Corporation for installation at its synthetic-rubber research center at Torrance, California. Gamma rays from cobalt-60 source of 26,000-lb unit will be used to start and modify chemical reactions in search for improvements in rubber, plastics, and radiation-resistant products for atomic-power units.

Unit, which can contain 20,000 curies of cobalt-60, has new type of "iris" source. This allows effective diameter of the source to be varied, thus permitting radiation-flux change from approximately 2×10^6 to 7×10^7 rads/hr.

Uranium-production results for last half of 1958

Domestic-uranium-production statistics for last six months of 1958 were recently announced by AEC. As of January 1, 1959, domestic ore reserves were estimated at 82,500,000 tons.

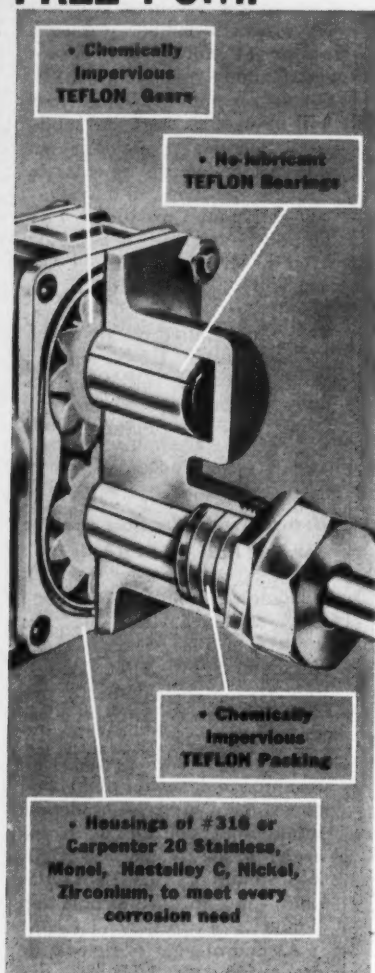
For six-month period, ore receipts at private plant and government purchase depots totaled 3,011,000 tons with average grade of 0.255% U_3O_8 and total of \$1,177,883 was paid in initial production bonus.

At end of year ore stockpile amounted to 1,747,636 dry tons. There were 23 uranium processing mills in operation. Combined rated daily capacity of these mills was 21,065 tons/day of ore.

Nuclear plant in Florida to produce 50,000 kw

AEC has announced that a contract has been signed for the construction of a \$26 million gas-cooled nuclear-power plant for the Florida west coast area. Plant will generate about 50,000 kw and will be designed as prototype for 200,000 kw plant. Estimated date of completion is June 30, 1963.

CONTAMINATION-FREE PUMP



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are the only completely non-contaminating pumps on all scores—housing, pumping mechanism and lubrication (utilizes pumped fluid, even lightest of solvents).

Specify for chemically pure products. Write for literature.

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ECO

the big name in small pumps
for the process industries

Check 2122 opposite last page

NUCLEAR NOTES

CPI radioisotope users increase 18% in 1958

Number of industrial radioisotope users in chemical field increased more than 18% in 1958 according to recent report from Atomic Industrial Forum. According to report, number of new companies of all types using radioisotopes rose nationally by almost 13% in past year.

(Inquiries on availability of report entitled "The Atomic Industry-1958" should be addressed to Atomic Industrial Forum, 3 East 54th St., New York 2, N.Y.)

Public invited to review reactor safety aspects

AEC has announced that the public will have opportunity to participate in consideration of the safety aspects of all reactor projects in the Commission's Power Demonstration Reactor Program. Hereafter this applied only to those reactors that were privately owned.

Atomic-particle discovery completes predicted list

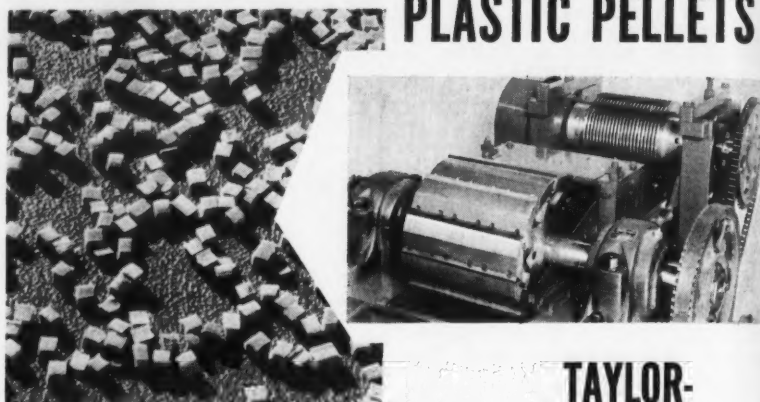
Recent discovery of neutral cascade hyperon (Xi-Zero particle), by scientists at University of California completes list of presently predicted set of particles of ordinary matter. Mass of the particle is approximately 40% greater than that of a proton. It has no electrical charge and exists for only a few billionths of a second. Upon decay, it disintegrates into two zero-charged products. The discovery has no immediate practical application.

Nuclear power plant proposals invited

Euratom and the AEC have announced that private and government enterprises in the countries comprising Euratom have been invited to submit proposals to build and op-

To page 24

you get 99% uniformly sized PLASTIC PELLETS



TAYLOR-STILES when you cut sheet or bar stock on PELLETIZERS

Pelletize Polyethylene, Polystyrene, nylon, vinyls, and sheet cellulose and other materials to uniform size. Providing there are no variations in thickness, and the edges of the sheet or rod stock are even, 99% of the pellets cut on a Taylor-Stiles Plastic Pelletizer will be uniform in size and shape.

Such pellets are more saleable. They make for better controlled compounding of mixes and batches. More uniform molding and extruding result.

Taylor-Stiles cutters pelletize continuous sheet or rod stock from calender or extruder at rates from several hundred pounds up to 20 tons an hour!

Available in a wide range of sizes and capacities—in several different models, which can be modified to meet special conditions.

Taylor-Stiles Pelletizers have been in actual plant operation for over 20 years. Used by the majority of America's primary producers of diced plastic and rubber stock. Their clean cutting, high production rates, low maintenance costs, ease of operation, and long knife life have earned them a reputation second to none.

Why get longs, fines and irregular shaped pellets that lead to problems in molding and extruding—when you can get 99% uniformity of pellet size with a Taylor-Stiles Pelletizer?

Write today to get all the facts about how you, too can get 99% uniform pellets, a more saleable and better running product by installing a Taylor-Stiles Pelletizer.

Mail coupon today for free folders

TAYLOR, STILES & COMPANY

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Riegelsville, N. J.

Please send me the following folders:

- ☐ Folder 217 800 Series Pelletizers (For Plastics)
- ☐ 213 "Little Giant" Dicing Cutters & Pelletizers (For Plastics and Rubber)
- ☐ 210 700 Series Plastic Pelletizers (To cut up to 20 tons of small pellets per hour)
- ☐ 202 Rubber Cutters & Pelletizers

Name.....
Company.....
Address.....
City.....State.....

Check 2123 opposite last page

CHEMICAL PROCESSING

**THAT'S
INTERESTING**

**Crop seed
treatment**

Interest is mounting in molybdenum seed treatment of crops, reports Climax Molybdenum Co. Firm says its new development in this field can be applied to seed while inoculating or slurry-treating with other materials. Compound is said to be completely compatible with legume inoculants. Material contains a highly effective adhesive compound which makes it stick to seed tightly, providing a coating which won't rub off during planting or handling.

Graduation

U.S. colleges are expected to graduate 39,000 young people this year with bachelor degrees in engineering. This is up 4000 from 1958; nearly 8000 from 1957, reports Engineering and Scientific Manpower's Newsletter.

For more information on product at right, specify 2124 see information request blank opposite last page.



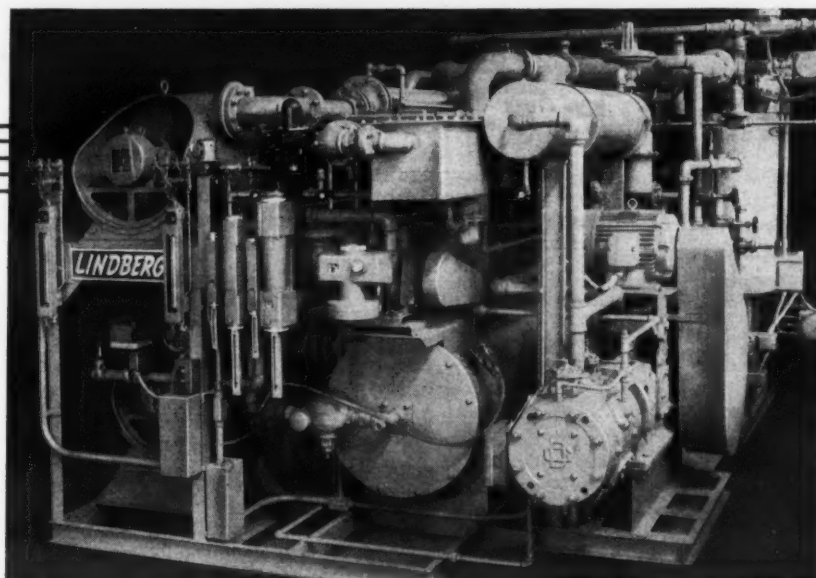
***Atmosphere of 99.99% inert gases now
provided by new Lindberg HYNi Generator**

****Completely new, fully automatic, dry process
provides highest degree of nitrogen purity**

*****This process produces nitrogen for only
\$0.17 to \$0.20 per 1000 cubic feet**

In chemical processing, this superior nitrogen atmosphere is useful in blanketing processes under non-flammable, non-oxidizing, non-toxic, and bacteria-free conditions. It is ideal, too, for purging, bubble agitation, displacement of air, and pneumatic conveying. In the

metals industry, this high purity nitrogen atmosphere is used for annealing, normalizing, brazing, hardening, and sintering. In food processing this inert atmosphere protects product quality, flavor, color, odor and appearance from contamination, oxidation, or bacterial action.



This new HYNi generator is an important addition to Lindberg's complete line of controlled atmosphere generators. It is available in capacities from 1,000 to 10,000 SCFH. Write us for complete information on this remarkable new unit, and other Lindberg generators for any required atmosphere type.

****How The Process Operates**

This 99.99% pure atmosphere is produced by a completely new, dry, fully automatic process. It uses the principle of burning a hydrocarbon fuel in a separate catalytic combustion chamber to obtain complete reaction without unburned methane, high residual oxygen or a high percentage of oxides of nitrogen. Carbon dioxide, water vapor, sulphur dioxide or hydrogen sulphide are simultaneously removed in a dry, absorbent material known as Molecular Sieve made by Linde Division of Union Carbide and Chemical Corporation.

***Sample of Analysis**

Obtainable With HYNi Generator

Oxygen.....	0.00%
Carbon dioxide.....	0.01%
Hydrocarbons.....	0.00%
Water vapor:	
Less than -80° F. dewpoint (7 p.p.m. when measured by a Beckman Hygrometer)	
Hydrogen.....	0.00%
Carbon monoxide.....	0.00%
Sulphur.....	0.00%
Oxides of nitrogen.....	0.00%
Nitrogen and Argon (trace).....	99.99%

****This Process is Economical**

One of the advantages of this process of producing nitrogen is its low cost. With the HYNi Generator the nearly-pure nitrogen is produced for only \$0.17 to \$0.20 per 1000 cubic feet. Cost of power, raw gas and cooling water is included and based on: fuel gas at \$0.60 per 1,000,000 BTU; electricity at \$0.01 per KWH; cooling water at \$0.05 per 1000 gal. Quoted cost does not include maintenance or amortization. Lindberg quality design and construction assures complete dependability and lowest maintenance cost.



GAS PROCESSING DIVISION

ENGINEERING COMPANY

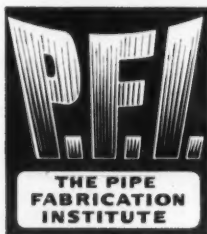
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"But officer, we were only hurrying to pick up his P.F.I. STANDARDS!"

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- 1 Machining Backing Rings for Butt Welds
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The traffic officer could be more sympathetic, but he's heard all kinds of "fabrications" . . . unfortunately, he doesn't understand the many problems of pipe fabrication or he would know all about the value of P.F.I. Standards.

These P.F.I. Standards are packed with vital data on the design, the fabrication and erection of high pressure and high temperature piping used by all industry. However, these technical bulletins do not explain the many advantages of shop fabrication.

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1 2 3 4 5 6 7 8 9 10

Name _____

Company _____

Address _____ City _____ State _____

NUCLEAR NOTES

From page 22

erate nuclear power plants under the joint U.S.—Euratom program.

Objective is to install about one million kilowatts of electrical generating capacity in Western Europe within next four to six years. Deadline for submission of proposals to AEC is September 1, 1959.

Power level doubled for research reactor

Power level of research reactor at Battelle Memorial Institute has been doubled. Operating level has now been boosted to two million watts. Principal modifications made include installation of new fuel elements and replacement of 900-gpm cooling water pump with a 1500 gpm unit.

More CO₂ removal units for atomic subs

Ten more carbon dioxide scrubbers are being built by Girdler for installation in missile-type atomic submarines. This brings to 31 the number of units to be constructed by the company for the Navy. Device enables subs to remain underwater for extended periods by removing carbon dioxide from crew's air supply.



"Button, button—who's got the button?"

How Blaw-Knox cuts your power piping costs

THAT'S
INTERESTING

Zinc fights corrosion

Zinc anodes were installed on submerged part of hull of the 70,700-ton tanker, S. S. Princess Sophie, to protect it from corrosion. Corrosion results from passage of electrical current to the surrounding water. *Horse Head Bulletin* of New Jersey Zinc Co. says best way to stop corrosion is to direct flow of current to the steel from its surroundings. Zinc is said to be ideal in that it generates the optimum counter-current to suppress the destructive flow.

Paper money

It takes 2000 tons of paper to make a year's output of U. S. currency. Postage stamps take 1000 tons. Postcards account for 6000 tons. And 10,000 tons go into embossed stamped envelopes.

For more information on product at right, specify 2126 see information request blank opposite last page.

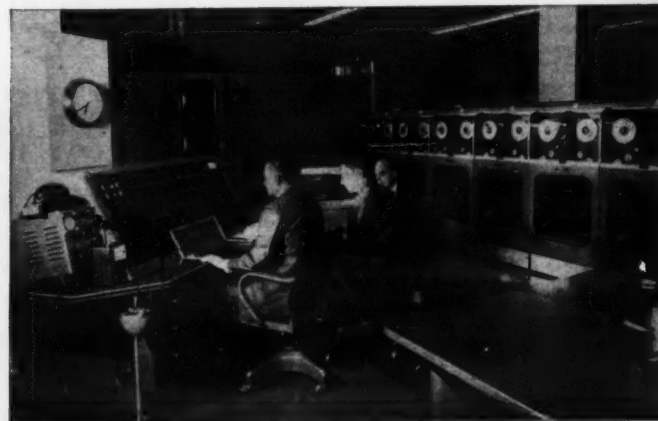


121,000 square feet of space at your service. Power piping facilities at Pittsburgh include 56,000 square feet of plant area and an additional 65,000 square feet for exterior storage. An additional new plant is located on a 15-acre site in Jackson, Mississippi.

Your job is under the personal supervision of an experienced engineer, who follows your project from beginning to end. Your piping is handled with the most modern equipment for welding, heat treating, and bending. Fabricating techniques, proven by rigid testing, are used.



New product development. Blaw-Knox developed an enclosed type of functional spring hanger as part of their complete line of hangers for supporting any piping system. Here a group of hangers individually designed for a project is factory checked to assure fast field erection.



Stress calculation cut from months to a day . . . with pace-setting engineering. An exclusive Blaw-Knox method uses an electronic computer for automatic computation with no limitation on the complexity of system. Full accuracy, with tremendous savings in time and cost. Write for details.



BLAW-KNOX COMPANY

Power Piping Division
829 Beaver Avenue, Pittsburgh 33, Pennsylvania

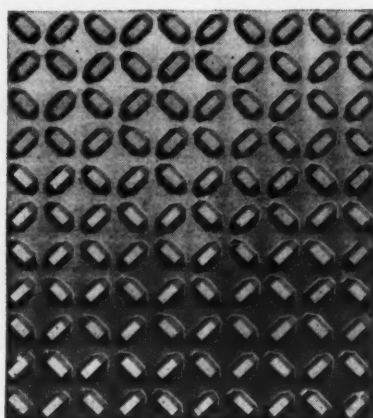


One slip can cost more than **USS** Multigrip

\$100,000 for a single fall? Sounds fantastic, doesn't it? But there are actual cases involving suits for \$100,000 or more for single falls. The average cost of injuries from slips and falls is lower than that, of course. In six states, during 1954, the cost per fall averaged close to \$900.

You can eliminate many slips and falls by giving your workers a floor studded with cleats—USS Multigrip. This floor plate provides safe traction in any direction. The cleats are flat on top, easy to walk on—and do not catch the shoe.

For machine shops, loading plat-



forms, cat-walks, and other dangerous locations, Multigrip supplies safety plus.

Where floors take a heavy beating from traffic, Multigrip will stand up for years under constant use. Oil and water won't soak in and can be easily removed from the surface with regular cleaning materials. You save money by having a floor that is easy to sweep or flush clean—and there's little or no maintenance.

On your next inspection trip, search out the danger spots—and make them safe with USS Multigrip.

USS is a registered trademark

Sold by leading distributors from coast to coast.

United States Steel Corporation — Pittsburgh
Tennessee Coal & Iron — Fairfield, Alabama
Columbia-Geneva Steel — San Francisco
United States Steel Supply — Steel Service Centers
United States Steel Export Company

United States Steel



CHEMICAL PROCESSING

General Mills has diversified operations, and since 1955 has achieved notable success with its Chemical Division. In entering this new phase, it has found that . . .

'Bottom-up' Management Policy Proves Worth in Seminars

PAUL HOFFMAN, News Editor
and
THEODORE W. WETT, Associate Editor

General Mills' Chemical Division, although less than half a decade old, runs its own show. It is its own master — proof that the company's "bottom-up" management policy is fact not fiction.

The division is strictly an autonomous operation, headquartered at Kankakee, Ill. — 475 miles from General Mills' home office at Minneapolis. Still, the division is in close liaison with development and research work being done at the central research laboratory.

Charles H. Bell, president, is the man at the helm of GM's "bottom-up" management development program. He has said he believes this philosophy creates an atmosphere conducive to the greatest possible growth of every individual and will provide more effective manpower.

In this program, "the responsibility for performing managerial duties is decentralized and delegated as far as possible consistent with sound practice and company policy.

"This method of management distributes as much decision-making as possible all the way from the top man down to first-line supervisors.

"Persons at every level are encouraged to make decisions, get results through others, and play a real part in company affairs. Each manager is given an opportunity to develop his abilities through practice, and is encouraged to bring all of his creative talent and ability to the solution of company problems.

"Within the framework of broad company operating principles, each is given great latitude in determining his own methods for getting things done, and each is given full opportunity to take part in final decisions on matters affecting his responsibility.

"Thus, everyone on the management team sharpens his skills and develops his potential while the management problems of policy making, planning, and organizing become simpler and less pressing for those who carry that responsibility."

Chemical Division

The Chemical Division is an outstanding example of how decentralization in General Mills has been implemented as a follow up on this policy. Emerging as an entity in late 1955, the division under the guidance of Arthur D. Hyde, executive vice president, al-

ready has become an important factor in polyamid and fatty nitrogen markets.

Helping to spark this steady growth was the philosophy of James Ford Bell, first president and builder of General Mills, that research is a key function of company operations. Following this philosophy, research in chemical derivatives of soybeans, wheat, and animal fats led to the development in 1946 of polyamid resins. This was the cornerstone upon which the Chemical Division was built.

The research also provided a fund of knowledge on polymerization, amidation and hydrogenation leading to the scores of diversified products now being marketed by the division. It also put the division in the unique position of having an unusually large reservoir of technical information on potential uses, and it posed a problem: how to disseminate this knowledge for practical application by potential customers.

Seminars

In line with the company's "bottom-up" management policy, William F. Mitchell, general manager of the Chemical Division, and manager of sales Howard T. Von Oehsen devised a plan which solved the problem on their own.

They conceived the idea of
To next page



Dr. Harold Wittcoff, General Mills director of research, drives home a point during seminar on fatty nitrogen chemicals

holding seminars in key marketing cities at which a team of research and development specialists presented a day-long session of practical chemical knowledge that had taken years to develop in the laboratory.

Through these seminars, they saw the opportunity to open the door to closer liaison between the Chemical Division and customers.

Further, these seminars presented the opportunity to obtain for the division recognition as a supplier of chemicals to a broad spectrum of industry.

To achieve this goal, Von Oehsen "engineered" quick-paced, attention-holding presentations designed to create in the audiences' mind ideas on how the inherent properties of the division's chemicals could be utilized for making new products and improving existing products.

In effect, these seminars were designed to educate other researchers on application of these chemical compounds. The purpose was to go behind the trade name or label and point out what properties, purities, and possible applications individual compounds possessed.

And, of course, these research-to-research meetings provided a base for long-term sales growth.

Scientific Expeditions

To date, two of these scientific expeditions have journeyed from Kankakee across the country by air, rail, taxi, and bus. The first series of seminars in 1958 covered the Versamids field. Meetings were held in Philadelphia, New York City, Boston, and Chicago.

As the result of experience gained that year, R. B. Kron, assistant to manager of sales, was assigned the responsibility of coordinating all phases of the 1959 "tour" or fatty nitrogens, which was a more ambitious undertaking than the previous one.

The 1959 seminar team carried the fatty nitrogen story to Philadelphia, New York City, Chicago, and Los An-



Mapping plans for the Chemical Division's 1960 activities are, left to right, R. B. Kron, assistant to manager of sales; William F. Mitchell, general manager, and Howard T. Von Oehsen, manager of sales

geles — in just five days. Thus, the story could be told from coast to coast while "it was still news." The schedule was so tight that after the eight-hour-long meeting at the Waldorf-Astoria Hotel, panel members had only an hour and 35 minutes to pack props, slides, and other paraphernalia and catch the plane at La Guardia Field. They made it!

Panelists on the 1959 team were D. L. Andersen, group leader, organic development section; A. J. Freeman, market development manager; J. E. House, market development department; R. B. Kron, sales department; Dr. K. E. McCaleb, head, nitrogen products section, research department; D. E. Terry, technical service manager; Dr. Harold Wittcoff, director of research; and Von Oehsen.

Seminars were engineered to present topics as diversified as General Mills' operations. Painstaking preparation, hours of rehearsal and editing resulted in fast-moving, palatable programs.

Although seminars ran eight hours, proof that they were packed with useful and usable technical information was the fact that almost everyone remained for the complete sessions. Von Oehsen remarked: "In some instances, those attending seminars at the start asked permission to call in additional technical people from their companies for the

remainder of the meeting."

Have the seminars been successful? Let's first look at some audience reactions. The chemical development manager of a large plastic company wrote:

"The General Mills symposium was not only the best engineered one of these things that I have ever attended, but it was also extremely informative."

More Reactions

From the production manager of an uranium firm:

"The presentations made by the people on your staff were very good and covered a variety of interests. Of particular interest to us is the continued development of fatty amines for extraction of uranium from sulfate leach liquors."

The manager of product development for a leading chemical company had this to say:

"I want to thank you for the very educational seminar. I feel I picked up a number of very good ideas."

An official of a major petroleum company wrote:

"You can be assured that we found these meetings to be most profitable. General Mills certainly did everything in their power to make the seminar attractive and profitable to all those present."

Among benefits attributed directly to the seminars have been the development of a



Dr. Harold Wittcoff (left), director of research, and Howard T. Von Oehsen, manager of sales for General Mills' Chemical Division, congratulate each other on success of 1959 series of seminars

variety of new products by GM customers. Among these is "concrete from a can," a patching compound consisting of a Versamid-epoxy system developed in the division's laboratories; an uranium liquid-liquid extraction method, and an anti-static coating for rugs and floors. In addition to these specific items, there are several projects in development stages which are expected to materialize during the next six to nine months.

Wider Recognition

Still another benefit has been to give the division wider recognition as a supplier. Field men report they have found it easier to contact more of the "people that count."

Seminars also have had unexpected indirect benefits. Latent writing and speaking talents of research and development personnel have been brought into full bloom. At first hesitant to appear before a group, some seminar speakers have become polished platform performers.

From what they had first considered a "task," participation in seminars now has become almost the object of competition, with speakers often vying for places on the team.

Although the division's personnel offered a "no comment" when asked about

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Obtaining benzene and naphthalene from Soviet sources has stirred up a ruckus. Not everyone agrees this practice is an important factor causing long-range problems for chemical processors. Here . . .

Readers Offer Divergent Views on Importing Iron Curtain Aromatics

Importation of benzene and naphthalene from behind the Iron Curtain has evoked widespread comment.

Many Americans have been quick to denounce this practice by certain chemical processors. Some have pointed out that doing business with the Soviets in these important chemicals is a signpost indicating considerable trouble ahead. O. V. Tracy, in his discussion of Iron Curtain Aromatics (page 25, February CP) said competition from Russia "poses a serious current and long-range problem."

CHEMICAL PROCESSING, in conjunction with the Tracy article, invited

views from its readers on this timely and controversial subject. Some respondents agreed over-capacity right in our own backyard is as pressing a problem as importing aromatics from the Soviets. Others were of the opinion such imports are "old hat."

The editors have selected for publication three letters they feel most aptly mirror the controversy. Opinions are solely the writers' own, and in no way are to be construed as reflecting the policies or thinking of their companies . . . or of CHEMICAL PROCESSING magazine. Here are these readers' views.

'We've Overbuilt Domestic Capacity'

PAUL B. GIBSON
United States Steel Corporation
Pittsburgh

Mr. Tracy's analysis of the benzene import problem omits what I feel is a very important point. Benzene imports are not a new factor in the supply picture, having been with us in sizable quantities for 10 years. The largest volume was in 1956, when nearly 70 million gal of crude and refined benzene arrived, mostly from Iron Curtain countries.

It seems to me illogical to blame imports as the cause of our current troubles, when the potential size of imports

has been long known, yet expansion of domestic capacity has sped on. In the period 1957-59, petroleum companies will have added 101 million gal of benzene capacity. A good part of this recent expansion wave must have been made knowing that full plant utilization would probably not be attained at once because of heavy imports.

Not A Liability

There are good reasons why we do not have to consider the present overcapacity as a liability:

1. The United States can be self-sufficient in benzene should the world situation worsen.
2. Capacity built now may be cheaper than capacity built later.

3. Temporary partial utilization of facilities may be better and more profitable than not getting into the petrochemical field at all.

Let's admit that we have overbuilt our domestic benzene capacity, pre-anticipating the market by several years. Perhaps our techniques of marketing research are not all they should be, resulting in over-optimistic market forecasts and inadequate consideration of what other producers may do. But let's not blame imports for a temporary over-supply situation we have brought upon ourselves.

'Let's Look Beyond Our Own Noses'

JOHN N. PEIRCE
Lummus Company
New York City

The controversy over the importation of aromatics is an important one. However, I cannot fully concur with Mr. Tracy's assignment of the blame for the market situation.

If the problem is reduced to its simplest form, it will be seen that the supply is greater than the demand. Now let us ask why.

Over-capacity seems to stand out. With our 1959 benzene capacity set at 450 million gal and a demand of 335 million gal, it is obvious that our potential is 65 million gal greater than the market. Less than 50 million gal are imported, and not all of this from Iron Curtain areas, so I feel that we are at least equally to blame for the situation.

Economic Cost High

Examine the modus operandi of the chemical industry, that of first creating a product and then building the demand. Of course, we have shown technological advances of great magnitude by this means, but at the same time at great economic cost.

To the best of my knowledge, the chemical industry has never posted earnings and yields consistently matching the industrial average. The growth rate of chemical securities though is sufficient to keep them in the market.

The trend toward large government deficit spending also contributes heavily to the importation problem. The widely publicized effects of inflation are beginning to become apparent. Deficit spending yields inflation which raises costs because of the higher wages demanded to retain buying power.

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Company representatives who aren't always bucking for sales are something of a breed apart. The wide variety of help offered by men of Hercules' Paper Makers Chemical Department literally make them . . .

• CHEMISTS TO THE PAPERMAKER

IN A DESCRIPTION of the technical and service representatives of Hercules Powder Company's Paper Makers Chemical Department there is embodied a broad spectrum of abilities and capabilities which make these men rather unusual on the industrial scene.

This group, relatively small in number in the corporate image, has made and are making significant contributions to the advance of papermaking from an ages-old art to a modern science.

Organic chemistry is their forte. But they are equally adept as engineers, operators,

and authors of technical reports which becomes a vital part of recommendations aimed at maximizing customer product quality and operating efficiency.

Being chemists to the papermaker, as they are, is not a new concept. It was evolved years ago. The basic philosophy of the organization which has become the Paper Makers Chemical Department was not one of just being a jobber or chemical supply house. Rather, it was to develop chemical materials which would accomplish specific papermaking objectives. This was possible because the same problems are common to all areas, and an answer once worked out can be of broad usefulness.

Unified Supply Source

Just as basic was the philosophy of developing know-how to assist the papermaker in selecting chemicals. Of course, a unified source of supply for these chemicals was essential.

Thus, by mixing fundamental ingredients in the crucible of progress, a truly specialized customer chemical service has evolved.

Among the important members of this technical service team are Thomas S. Morse, manager, sales service, paper chemicals; Prosper F. Neumann, sales manager, rosin

size; W. Donald Thompson, sales manager, miscellaneous paper chemicals, and James K. Farrell, manager of product improvement, paper chemicals.

A Paper Makers' representative often is in on the ground floor when a new mill is being planned. He might assist the papermaker in designing the plant, and recommend installation of the emulsifying system and rosin size storage and handling equipment. Or he might check preliminary drawings and suggest changes.

Later he might inspect the installation and assist in the startup and adjustment of equipment, thus offering specialized help and information at a time when it is needed the most.

Assistance given during a startup enables the representative to obtain an intimate knowledge of the installation, thereby making it possible for him to give optimum service should future problems arise.

Helping Plant Personnel

At another time he might be asked to acquaint plant personnel with the use of various chemicals in the papermaking process. Or he might even be called upon to conduct paper tests and suggest changes in furnish makeup.

Each plant experience broadens his knowledge so that he becomes conversant with a wide variety of problems, such as development of new papers, foaming, sizes, and many others.

The representative's recommendations for proper rosin size and wet strength is of paramount importance to the papermaker. The manufacturer knows that old-type rosin size can be made by anyone, but results often leave much to be desired. Use of the new

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Hercules technical service man taking a pH sample from stock chest in paper mill

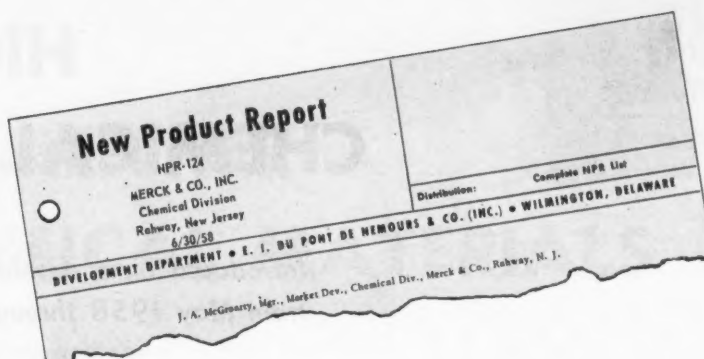


◀ Hercules technical service representative and paper mill engineer check control board to observe operating conditions of entire stock preparation area

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New Developmental Chemicals	page 33
Manufacturer's Directory	page 44



Uncovering new products developed by other companies and disseminating specific technical data to key company personnel is an important part of this firm's pattern of progress. Here's how . . .



Du Pont's 'Central Information Agency' Sifts New Development Materials

DR. GEORGE W. RIGBY, Development Department, E. I. du Pont de Nemours & Company

Dr. George W. Rigby joined Du Pont in 1930 as a research chemist at the Buffalo, N. Y., rayon plant. His career since then covers years of research on a variety of materials; technical investigations and two years as European technical representative to follow technical and research developments in that area. With the exception of these two years, 1955-57, he has been a staff member of the Development Department since 1945.

He has been a prolific contributor to chemical literature. His specific field of interest has been the economics of the chemical industry. He has more than 30 patents and numerous journal articles to his credit.

Dr. Rigby is a member of the American Chemical Society, American Oil Chemists' Society, American Association for the Advancement of Science, and the Franklin Institute. During the war he served on the National Defense Research Committee.

More recently he was a member of the Chemical Subcommittee of Fats and Oils of the Munitions Board. In 1957 he was named to the President's Commission on Industrial Utilization of Agricultural Products.



At any given time, Du Pont has scores of new products under study. Moreover, its engineers and chemists are constantly exploring new ways to make existing products, and looking for new raw materials to use in established processes.

This never-ending search might be likened to a vast hunger, requiring—for proper nourishment of the corporate body—the prompt and regular feeding of information

about new development materials to key company individuals.

Virtually every one of the 400 or 500 new chemicals introduced every year is of interest to someone in Du Pont, and therein lies one of the problems that had to be overcome in organizing a technical and commercial information service for use within the company.

A new-product information service was initiated soon after World War II. Associated with the author now are three other persons, including two non-technical assistants.

We comprise what might be called a "central information agency." We seek to find new products developed by other companies, and pass information on to those in Du Pont likely to be interested. This not only helps our own progress, but opens up a potential market for other companies.

From the outset it was recognized that this service should emphasize regular and continuing communication—so essential within a complex

organization like Du Pont.

The first step was to get together with Purchasing Department experts, for theirs is the job of day-to-day contact with suppliers. In most instances they would be the first to know of a new development material that might be of interest to Du Pont. A cooperative arrangement was worked out whereby information of this nature is channeled to us.

Another way we learn of new materials is from papers presented before professional societies, and through the business, technical, and trade press. The supplier himself, then, is our principal source of information about new chemicals.

Next, we must interest our research people. To do this, we want to know where their interests lie, what they are working on. Moreover, we want this information coming in to us on a regular basis. We want to know who would be interested in what.

To insure a flow of information

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HIGHLIGHTING CHEMICAL MATERIALS

*Introduced on a developmental scale
from May 1958 through April 1959*

This report covers developmental scale chemical materials introduced from May 1958 through April 1959. Directly below, all materials are indexed by their suggested uses. An alphabetical listing of individual products begins on the facing page. Full names and addresses of manufacturers are given in Manufacturers Listing on page 44.

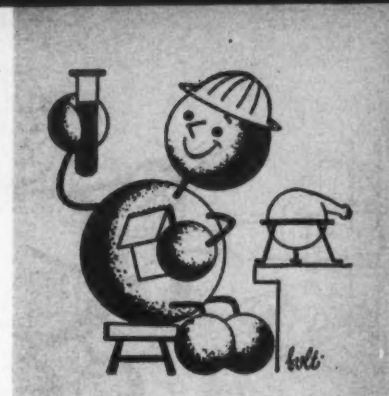
CHEMICAL USE-INDEX

To locate a group of items quickly, check through this index. Then look up numbers of those chemicals classified under a specific-use heading in the alphabetical listing. If material is listed as an intermediate for that end-use, it is indicated as an "Int."

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DEVELOPMENTAL CHEMICAL MATERIALS

These are the chemical materials made available on a developmental scale from May 1958 through April 1959. List includes only those materials reported as being produced in pilot plant or semi-works quantities with one pound (or larger) samples available for evaluation. If you would like additional information on any item, contact manufacturer. Full names and addresses are listed on page 44.



Unless otherwise specified . . .

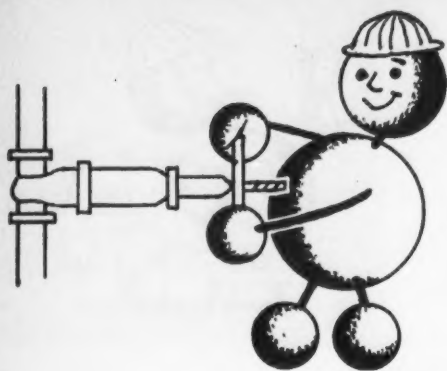
Pressures are mm Hg (abs)
Boiling Points are at 760 mm
Temperatures are in °C
Solubilities are at room temp

FOR EASY REFERENCE as to specific use, check convenient "Use-Index", facing page.

NAMES AND ADDRESSES of manufacturers, page 44.

- 1) Acetal Resin — Delrin molding, extrusion powders. High tensile strength, tough, resists solvents. Du Pont
- 2) Accobond — Bonding agents, syrup or dry powder. Water-soluble, penetrate smooth surfaces. Am Cy
- 3) p-Acetylamino Benzenesulfonyl Chloride — Pharmaceutical int. Diamond
- 4) Acrylamide-N,N'-Methylene bis-Acrylamide — Cyanogum 41, gelling agent mixture. Dry powder. Sol in hydrophilics. Stiff gel at 5-10%. Am Cy
- 5) Acrylic Emuls — Dispersion HA-773, 45%. Fabric finishing. Resistance to washing, UV exposure. Rohm & Haas
- 6) Acrylic Emulsion — RWL-200, latex (40% solids). Polymer floor polishes. Readily formulated, clarity, non-yellowing. Morton
- 7) Acrylic Emuls, Neutralized — Thickener 510, cloudy soln, 10%. For natural, synthetic latices. Pourable, efficient. Rohm & Haas
- 8) Acrylic Esters — Solvent polymerized resins K-6493, K-6494. Waterproofing synthetic fabrics. Rohm & Haas
- 9) Acrylic Latex — Trenisol S-3430 aq emuls. Adhesive, pigment binder. Int floor wax, leather finishes. Stable, no vulcanization, excellent aging. Alco Oil
- 10) Acrylic Resin — Lucite 147 extrusion powder. Free from crazing, easy fabrication. Du Pont
- 11) Acrylic Soln — Tamol 850. Clear, colorless liquid, 30%, dispersant for inorganic pigments. Low foaming. Rohm & Haas
- 12) Alipal PE-510 — Liquid free acid of complex organic phosphates. Good emuls & dispersing agent; wide solubility detergent. Gen'l Aniline
- 13) Alipal LO-529 — Na salt of complex organic phosphate ester. Viscous, free-flowing liquid detergent. Compatible-electrolytes, retards rust. Gen'l Aniline
- 14) Alkaline Cleaning Cmpd. — NR Cmpd. Wt powder cleaner leaves protective film. Cowles
- 15) Alkyl Aryl Hydrocarbon — Conoco H-35, liquid. Sec vinyl plasticizer. Water wt; heat, light stable. Cont'l Oil
- 16) Alkyl Aryl Polyether Alcohols — Triton X-172. Liquid, 100% active emuls for ag pesticides. Versatile. Rohm & Haas
- 17) Alkyl Dihydroxy t-Amine — Sipene SWU, 95% liquid cat for urethane foams, epoxy curing agent. Eliminates odors. Am Alcolac
- 18) Alkylolamide — Agent 187-62, fatty acid. Alkaline liquid cleaners. Stable to alkaline hydrolysis. Stepan
- 19) Alkyl Phenyl Polyethylene Glycol — Tergitol Nonionic E-35 experimental liquid det, wetting agent. Metal cleaning, bottle washing. Low foaming. Union Carbide Chem
- 20) n-Alkyl Propylene Ammonium Dichlorides — Aliquats 721, 726. Clay flocculation, bactericides. High cationic activity. Gen'l Mills—Chem

Continued on following page



21) **Aluminum Complex 101** — Colorless liquid coordination complex of Al & myristic acid. Imparts water repellency to paper, textiles, leather, etc. Du Pont

22) **Aluminum Silicates** — Kaolin extender pigments. Uniform flatting, film durability, superior hiding. Huber

23) **Amine Condensate, Modified** — Monamine ADS-100, liquid. Emulsifier, thickener in aq soln. Mona

24) **o-Amino Benzotrifluoride** — Liquid chem int. Maumee

25) **3-Amino-4-Chloro Benzotrifluoride** — Liquid chem int. Maumee

26) **Amino-Functional Silane** — Z-6020, liquid. Coupler: resin and glass or mineral wool; glass cloth and resins for laminates. Improves water resist, resiliency. Dow Corning

27) **Ammelide** — Wt crystals. Sol alkali, warm mineral acids. Insol water, organics. Am Cy

28) **Ammonium Chromate, Anhydrous** — Gran crystals. Int for corr inhib, paper fire proofing, pyrotechnics. No residue, acts at low temp. Solvay-Allied

29) **Amphoteric Sodium Oxyalkylate** — Triton QS-15 detergent. Stable to alkali, high detergency. Rohm & Haas

30) **Amylin** — High-amylose starch. Coarse wt powder. High gel strength. Nat'l Starch

31) **Amylose, Hydroxyethyl** — Superlose HAA-11, powder. Paper, textile coating, films, fibers. Sol by normal starch cooking. Forms strong, clear films. Stein Hall

32) **Anhydroennea Heptitol** — AEH, 70% soln. Surface coatings, surface actives, urethanes. Neopentyl structure, primary & secondary hydroxyls. Celanese

33) **Anionic-Nonionic Emuls Blend** — G-3306, liquid. Chlorinated insecticide emulsifier. Stable, versatile. Atlas

34) **Anionic-Nonionic Emuls Blend** — G-3307, liquid. Co-emuls for insecticides. Stable, versatile. Atlas

35) **o-Anisaldehyde** — Solid pharmaceutical intermediate. Ansul

36) **Antifoam** — F-21, liquid for alkaline peeling of fruits etc. Non-toxic, quick acting. Hodag

37) **Anti-Static Agent** — Michelene 616, liquid. Destaticize polyethylene, PVC films, extrusions. Also softener. M. Michel

38) **Aqueous Silicone Soln** — XR-20. Water repellent treatment of concrete. Low cost. Prevents spalling. Silicones UCC

39) **Araldite Hardener** — DP 112. Low vis epoxy hardener. Fast setting, curing at room temp. Ciba

40) **Araldite Hardener** — DP 114. Low vis epoxy hardener (furnished with accelerator). Cures under high humidity cond. Ciba

41) **Atlox 5000** — Nonionic surface active, solid, wetting agent for pesticides. Low foaming, economical. Atlas

42) **Atmul 500** — Paste, yeast-raised-product conditioner. Extends shelf life, improved dough conditioning. Atlas

43) **Attapulgit, Activated** — Pharmsorb, fine-micron powder. Anti-diarrheal bacteria adsorbent. Double adsorbency. Min & Chem

44) **Barium-Cadmium Organic** — Invin 91 liquid stabilizer for PVC film, sheeting, extrusions. High clarity, light stable. Nat'l Lead

45) **Barium-Cadmium-Zinc Organic** — Invin 205 liquid stabilizer for PVC film, sheeting, extrusions. High clarity, light stable, resists sulfide stain. Nat'l Lead

46) **Barium-Cadmium-Zinc Organic** — Invin 210 liquid stabilizer for PVC film, sheets, extrusions. High clarity, light, heat stable, resists sulfide stain. Nat'l Lead

47) **Barium Monohydrate** — Powder int for oil additives, barium chem. 98% barium. Sherwin-Williams

48) **Bentone 27** — Organic deriv of Mg montmorillonite. Powder thixotropic thickener for ind finishes. High gel efficiency, lt color. Nat'l Lead

49) **Benzophenone Derivative** — Uvinul 0-30 powder. UV stabilizer for resins. Wide solubility, compatibility. Gen'l Aniline

50) **Benzoyl Peroxide** — Luperco ABB-T, thick paste catalyst for polyesters. Uniform, non-separating. Lucidol W&T

51) **Butadiene Monoxide** — Liquid chem int. Reactive oxirane, double bond. Columbia-So

52) **N-tert-Butyl Acrylamide** — Stable reactive monomer. MP 128-130. Am Cy

53) **tert-Butylamino Ethanol** — Solid chem int. Rohm & Haas

54) **tert-Butylaminoethyl Methacrylate** — Liquid comonomer, chem int. Intro amino group. Rohm & Haas

Unless otherwise specified . . .

Pressures are mm Hg (abs)
Boiling Points are at 760 mm
Temperatures are in °C
Solubilities are at room temp

55) **Butylene Oxide** — Mixed normal isomers. Liquid int urethanes, det, lubs, textile chem. Isobutylene oxide cont 1% max. Union Carbide Chem

56) **1,2-Butylene Oxide** — Colorless liquid int for solvent stabilizers, surface actives, frothing agents. Single isomer. Dow

57) **t-Butyl Hydroperoxide** — 90, liquid catalyst for vinyls. High purity, water sol. Lucidol W&T

58) **n-Butyl Lithium** — In n-heptane. Liquid ethylene poly catalyst. Fluid organolithium reactions. Lithium Corp

59) **Butyl Lithium** — Soln. Cat for polymerizing isoprene, butadiene, etc. Clear, colorless. Foote

60) **m-Butyl Phenol** — Forms oil sol thermo-setting formaldehyde resins. Trifunctional. Stepan

61) **p-tert-Butyl Phenol** — Flaked, nearly wt solid antioxidant in cellulose acetate molding. Int other resins, adhesives, paint driers, etc. Union Carbide Chem

62) **Cab-XL** — Pellets. Crosslinkable polyolefins with high filler loading. Foams, coatings, moldings. No melting, stress cracking. Cabot

63) **Cacodylic Acid** — Solid herbicide. Ansul

64) **Calcium Chromate, Anhydrous** — Cryst powder. Int for catalysts, corr inhib, metal primers. Controlled particle size, anhydrous. Solvay-Allied

65) **Calcium Dichromate, Hydrate** — Gran crystals. Corr inhib systems, metal surface treatment, fungicides. Less alkaline residue, inert to saponifiables, oxidizer. Solvay-Allied

66) **Calcium Zirconate** — Powder. Electronic ceramics. Pure, uniform, controlled part size. Zirconium Corp

67) **ε-Caprolactone** — Colorless liquid. Polyester and urethane resins. No byproduct formation. Union Carbide Chem

68) **Caprolactone** — Liquid int for polyesters. Modifier, cross linker, plasticizer. Controllable reactivity. Celanese

69) **Caprylyl Peroxide** — Lupersol MMO, liquid catalyst for low temp polymerization of vinyls, olefins. Lucidol W&T

70) **Carbon, Activated** — Premium Darco, dry powder. Maintain drycleaning solvent purity. High decolorizing capacity. Atlas

71) **Carbon Black** — Azotone L, M, & H, fluffy powders. Reasonably priced blacks for news inks. Huber

Continued on facing page

FOR EASY REFERENCE as to specific use, check convenient "Use-Index", page 32.

NAMES AND ADDRESSES of manufacturers, page 44.

72) Carbon Tetrafluoride — Freon-14 compressed gas. Low boiling, stable, non-toxic, non-flammable. Du Pont

73) Cationic Polyamine — Aston AP, syrup. Efficient textile anti-static. 100% active, solvent sol, compatible. Onyx Oil

74) Cationic Polyelectrolyte — 600. Fiber treatment for filler retention. Water sol, easy handling. Nalco

75) Cationic Polyelectrolyte Coagulant — 600, liquid, water treatment. Water sol, easy handling. Nalco

76) Cationic Softener — Michelene 45, wt paste softener for Orlon, Nylon, acetate. Thermally stable, non-yellowing. M. Michel

77) Cerium Ethyl Sulfate — Crystal. Electronics. City Chem

78) Chelating Ion Exchange Resin — Dowex A-1, beads. Separation of: trace heavy metal contaminants from alkali soln; closely-related ionic species. High selectivity. Dow

79) Chlorinated, Built Synthetic Detergent — Clenescosure. Wt powder cleaner for food handling eqpt. Controlled foam. Cowles

80) Chlorinated Diphenol — Lt brown resinous solid int for CI containing epoxies. Chem int, reactive aromatic hydroxyls. Monsanto

81) Chlorinated Non-foaming Cleaner — Clenescosure. Wt powder cleaner. Non-foaming, chlorinated. Cowles

82) p-Chloro Benzenesulfonamide — Int for pharmaceuticals. Diamond

83) 4-Chlorobiphenyl — Wt cryst solid int. Hydrolyzable chlorine, reactive aromatic nucleus. Monsanto

84) 4-Chloro-2-Butynyl N-(3-Chlorophenyl) Carbamate — Carbyne S-847, emuls. Herbicide to control wild oats. Spencer

85) p-Chlorocinnamic Acid — Int for pharm, polymers. Diamond

86) Chrome Complexes — Liquid reactive complexes promote bonding; glass, natural fibers, etc. Du Pont

87) Chromic Chloride, Anhydrous — Powder catalyst, organic int. Reactive chromium for vapor phase reactions. Solvay-Allyed

88) Chromic Chloride, Anhydrous — Powder cat for polymers, olefins. Insol water, non-hygroscopic. Diamond

89) Coagulant — Nalcolyte 110, granular, non-ionic, high mw polymer for water clarification, floc. Nalco

90) Cobalt-Molybdenum-Alumina, Nickel Promoted — Nicomo-12 pelleted catalyst for hydrosulfurization, hydrogenation, metal removal from petroleum distillates. High activity, low density. Davison-Grace

91) Cobalt (ous) Sulfamate — Crystal. Electroplating. City Chem

92) Colloidal Silica — Dispersion. Nalcoag 1035 wax antislip, soil retardant—textiles, paints. 35% silica, opalescent liquid. Nalco

93) Colloidal Silica — Soln, Nalcoag 1022 antislip for paper, plastics, metals. Low pH, fast dry, uniform coat. Nalco

94) Copper-Clad TFE-Fluorocarbon-Coated Glass Fabrics — Solid sheets for printed circuits, cables. Thermally stable. Low electrical losses. Du Pont

95) Copper Potassium Chloride — Crystal. Electroplating. City Chem

96) Crotonaldehyde — Liquid solvent for varnishes, resins. Insecticide int, leather tanning. Eastman

97) Cyclic Urea Resin — N-17, clear liquid, 50%. Finishing agent for cotton, rayon. Crease resistance. Rohm & Haas

98) Cyclic Urea Resin — Rhonite N-3, clear liquid, 50%. Finishing cotton, rayon. Crease resistance. Efficient. Rohm & Haas

99) Cyclohexylamine — Colorless liquid chem int. Primary amine. Abbott

100) Cyclohexyl Isocyanate — Liquid pharmaceutical int. High purity. Carwin

101) Decanedioic Acids — DDA, wt powder, granules. Plasticizers, syn lubs, alkyds int. Acts like normal sebacic, lower price. U.S.I.

102) iso-Decanoic Acid — Liquid. Paint driers, ester-type lubricants, and plasticizers. Union Carbide Chem

103) Decyl-Octyl Acrylate — Liquid polymerizable monomer, chem int. Rohm & Haas

104) Delamins — C₁₃ primary aliphatic amines. Mineral flotation, chem int. High amine content. Hercules

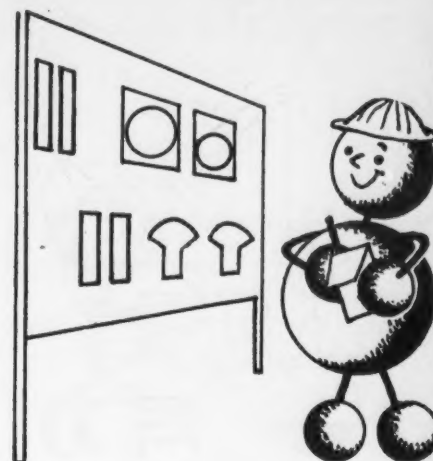
105) Dialdehyde Starch — Wt solid chem int, tanning agent, tobacco binder. Abbott

106) Diallyl Cyanamide — Liquid monomer, solvent, int. BP 222. Am Cy

107) N,N-Diallyl Melamine — Powder curing agent for epoxies. MP 142. Adds to double bonds, condenses aminos. Am Cy

108) Diatomaceous Silica — 222 Multicel. Coating, anti-caking agent for granular fert. Surface area: 68.5 m²/gram. Tamms

109) 4,4'-Dichlorobiphenyl — Wt cryst solid chem int. Hydrolyzable chlorines, reactive aromatic nucleus. Monsanto



110) 1,4-Dichlorobutene-2 — Colorless chem int for unsat ethers, esters, drugs. Reactive allylic halogens, double bond. Du Pont

111) 1,3-Dichlor-2-Propanol — Liquid chem int. Union Carbide Chem

112) Dicrotonylidene Pentaerythritol — Wt solid for coatings, adhesives, molding cmpds. Heat stable, yields strong resins. Celanese

113) Dicyclopentadiene Dioxide — Epoxide 207, powder. Resins, plasticizers, protective coatings. Union Carbide Chem

114) Diepoxide — AG-13E, liquid chem int with polyhydroxies, polybasic acids. Rohm & Haas

115) Diethylene Triamine-Pentaacetic Acid — Monaquest CAI-80, penta-sodium salt. Sequestration of iron at acid, neutral pH. Mona

116) Diglycol Chloroformate — Liquid chem int. Two very reactive chlorines. Columbia-So

117) 2,3-Dihydropyran — Liquid chem int for lysine, pyridine, etc. Quaker Oats

118) Dihydroxy Cyclopentene — Liquid chem int. Two reactive hydroxyls. Columbia-So

119) Di(Hydroxymethyl)Hexachloro Bicycloheptene — HET Diol, cryst solid. Chem int—pesticides, fire resistant resins. Difunctional, over 85% stable chlorine. Hooker

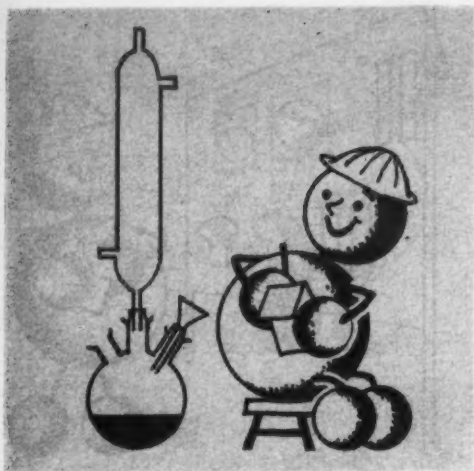
120) β-Dimethyl Amino Propionitrile — Liquid. BP 172. Int for dyes, pharm, insecticides. Solvent. Am Cy

121) O,O-Dimethyl-5-p-Chlorophenyl Thiomethyl Phosphorodithioate — Gen'l insecticide, miticide. Long residual effect. Wettable powder. Stauffer

122) 2,4-Dimethyl-6-tert-Butyl Phenol — DAV-AD 700, liquid antioxidant for lubs, jet fuels. Superior efficiency. Davison-Grace

122A) 3,5-Dimethyl-1-Hexyn-3-ol — Surfynol 61 volatile liquid surface active, viscosity reducer, anti-gel. Air Reduction

Continued on following page



123) **Dimethyl Maleate** — Colorless, mobile liquid. Resin comonomer, int. Carbonyl double bond reactions. Monsanto

124) **2,2-Dimethyl Pentanol** — Liquid, dehydration-heat-stable alcohol. Resin terminator. Eastman

125) **Dipentane Dioxide** — Epoxide 269, liquid. Polymers containing active hydrogen and epoxy-resin reactive diluent. Union Carbide Chem

126) **Dodecyl Chloride** — Liquid chem int. Rohm & Haas

127) **3-(tert-Dodecylamino) Propionitrile** — Colorless liquid chem int for corr inhib, greases, etc. Nitrile reactions. Monsanto

128) **3-(tert-Dodecylamino) Propylamine** — Colorless liquid. Int corr inhib, de-emulsifiers. Typical diamine. Monsanto

129) **Dodecylbenzene Sulfonic Acid** — Conoco LS-320, vis liquid int for anionic det, emulsifiers. Low inorganic acid content. Cont'l Oil

130) **Dodecylbenzyl Chloride** — Conoco DBCL, liquid int for cationic det. High activity. Cont'l Oil

131) **iso-Eicosanol** — Liquid. Detergents. Union Carbide Chem

132) **Emulsion B-10** — Amphoteric aq emuls of polyethylene. Alkali stable textile softener. Moretex

133) **1,3-bis[3 (2,3-Epoxy Propoxy) Propyl]-Tetramethyl Disiloxane** — Syl-kem 90. Difunctional epoxy silicone, reactive diluent. Intro siloxane linkage. Dow Corning

134) **Erbium Ethyl Sulfate** — Crystal. Electronics. City Chem

135) **Ethoquads** — Quaternary ammonium salts of ethoxylated fatty amines. Liquids. Stable & compatible. Armour

136) **Ethoxylated Lanolin** — Solan, wax. Water-soluble source of lanolin. Hydrophilic. Croda

137) **Ethoxylated Lanolin Alcohols** — Solulan 16, solid. Emulsifier, solubilizer—cosmetics, pharm. Exc pH stability, water soluble emollient. Am Cholesterol

138) **β -Ethoxy Propionitrile** — Liquid. BP 60-62 @ 10mm. Stabilizer misc in all common organic solvents. Am Cy

139) **Ethyl Di-n-Propyl Thiocarbamate** — Eptam pre-emergence herbicide, grassy weed control. Emuls conc. Stauffer

140) **Ethyl-3-Formyl-2,5-Endomethylene Cyclohexane Carboxylate** — Liquid. Resins. Union Carbide Chem

141) **2-Ethylhexaldehyde** — Liquid int for paint driers, stabilizers, herbicides, plasticizers, wetting agents, solvents. Eastman

142) **2-Ethylhexyl Crotonate** — Liquid int, Diels-Alder reaction. Perfume int. Eastman

143) **2-Ethylhexyl Epoxy Stearate** — Flexol Plasticizer EP-8, liquid plasticizer, stabilizer for PVC. Low vol, low vis, gives heat & light stability. Union Carbide Chem

144) **3-Ethyl-3-Hydroxymethyl Oxetane** — Liquid monomer. Bifunctional. Celanese

145) **Ethyl Isocyanate** — Liquid pharmaceutical int. High purity. Carwin

146) **Fatty Acid Ester** — Defoamer No. 4, liquid low-cost paper mill defoamer. Onyx Oil

147) **Fatty Amine, Cationized** — G-3570, high mw paste. Textile softener. Effective, uniform. Atlas

148) **Fertilizer, Odor Mask** — Fertomask liquid for organic, manufactured fertilizers. Various end-fra-grances. D & O

149) **Flexol Plasticizers** — 107-D, 163-D. Liquids. Polyvinyl chloride resins. Heat and light resistant; fungus resistant. Union Carbide Chem

150) **Fluoroalkyl Camphorate** — Fluid 316, straw-colored liquid lubricant. Resists thermal, oxidative, chemical deg. Du Pont

151) **TFE-Fluorocarbon Resin** — Teflon 7 fine molding, extrusion powder. Void-free moldings, impermeable sheeting, tubing. Du Pont

152) **FEP-Fluorocarbon Resin** — Teflon 100X extrusion powder. Resists heat, chemicals, weather. Tough. Du Pont

153) **Fragrance-Seal** — Spray-dried perfume bases for powdered detergents, soaps, etc. Increased shelf life. D & O

154) **Gadolinium Ethyl Sulfate** — Crystal. Electronics. City Chem

155) **N-Glycidyl Diethyl Amine** — Liquid int for drugs, cationic deriv of starch, paper, etc. Tert amine group & epoxy ring. Union Carbide Chem

156) **Glycidyl Methacrylate** — Colorless liquid monomer. Intro epoxy groups. Int adhesives, antistatics. Du Pont

157) **Guanylurea Phosphate** — Powder corr inhib; flame retard. Acid in soln. MP >230. Am Cy

Unless otherwise specified . . .
Pressures are mm Hg (abs)
Boiling Points are at 760 mm
Temperatures are in °C
Solubilities are at room temp

158) **Hansa Yellow** — G 12171, 12173; M 12172, 12174, powders. Enamel tints. Various yellow shades. Low oil absorption. Sherwin-Williams

159) **Hansa Yellow** — Permansa Yellow Lemon Pulp 12253, stir-in pulp. Latex paints. Non-toxic. Sherwin-Williams

160) **Hansa Yellow** — Permansa Yellow Lemon 12182, powder. Low oil absorption. Non-toxic. Sherwin-Williams

161) **Hansa Yellow** — Permansa Yellow Medium 12183, powder. Paints. Less bleeding. Non-toxic. Sherwin-Williams

162) **Hansa Yellow** — Permansa Yellow Primrose 12181, powder. Clean green shade primrose yellow. Inks. Non-toxic. Sherwin-Williams

163) **Heptene** — Liquid int: Detergents, alcohol. Fewer branch chains. Cosden

164) **α , α' -Hexachloro-m-Xylene** — Wt cryst solid. Int for monomers, polymers. High reactivity. Diamond

165) **Homopiperazine** — Liquid drug int. Unusual 7-membered-ring homolog of piperazine. Union Carbide Chem

166) **Hydrated Alumina** — XC-35. Catalyst base. Low soda content, 0.040% Na₂O. Pelletizable. Alcoa

167) **Hydrocarbon Polymer Emuls** — W-617, paint binder, rug backing, paper coating. High binding, low cost. Velsicol

168) **Hydrocarbon Polymer Emuls** — W-661, paint binder, rug backing, rubber tackifier. Stable over broad pH, small particle size. Velsicol

169) **Hydrocarbon Resin** — W-561, solid. Paint, varnish vehicles. Non-polar, high therm reactivity. Velsicol

170) **β -Hydroxyethyl Ether of Hydroquinone** — Solid int for urethanes, polyesters. Eastman

171) **Iron Phosphatizing Compd** — Ty-Bond R-1, wt powder. Phosphate coating on metals, cleans at same time. Cowles

172) **Isobutyl Isobutyrate** — Liquid int for perfumes. Solvent. Eastman

173) **3-(Isodecyloxy) Propionic Acid** — Colorless liquid. Soaps, lubs, corr inhib. Long-chain, oil-sol acid. Monsanto

Continued on facing page

FOR EASY REFERENCE as to specific use, check convenient "Use-Index", page 32.

NAMES AND ADDRESSES of manufacturers, page 44.

174) 3-(Isodecyloxy) Propionitrile — Colorless liquid. Chem int fatty amines, acids, etc. Typical nitrile reactions. Monsanto

175) Isophthalic Polyester Resin — Isolite 762, liquid. Hand layup, matched metal molding. Better working, adhesion. Schenectady

176) Isophthaloyl Chloride — Wt cryst solid. Int for monomers, polymers. Reactive. Diamond

177) Isopropyl Bicyclohexyl — Colorless liquid heat trans fluid. Thermally stable. Monsanto

178) Isopropyl Lanolate — Spreading, penetrating emollient. Hydrophilic, lubricity in small conc. Am Cholesterol

179) Lanolin Oil — Viscolan, liquid. All purpose cosmetic, pharm emollient. Oil soluble, clear. Am Cholesterol

180) Lanolin Wax — Waxolan, soft waxy solid. Cosmetics, pharm, polishes. Exc bodying agent. Am Cholesterol

181) Lanolyl Linoleate — Polylin, liquid. Lanolin, fatty acid combination. Cosmetic, pharm int. Stable emollient ester. Am Cholesterol

182) Lanolyl Ricinoleate — Ricilans A, B, & C, liquids. Plasticizers, spreading agents—creams lotions. Am Cholesterol

183) Lanthanum Ethyl Sulfate — Crystal. Electronics. City Chem

184) Lauroyl Peroxide — Alperox C, thick paste catalyst for low-temp polymerization of vinyls. Improved dispersion. Lucidol W&T

185) Lauryl Acrylate — Liquid polymerizable monomer, chem int. Rohm & Haas

186) N-Lauryl Morpholine — Sipene SWN, 99% liquid cat for urethane foams. Controllable reaction rate. Am Alcolac

187) Lead Sulfamate — Crystalline powder. Electroplating. City Chem

188) Lithium Hydride Dispersion — Used where regular lithium hydride will not work. Foote

189) Lithium Metal Dispersion — Poly catalyst, reaction int. Uniform particle size, clean surface. Foote

190) Lithium Perchlorate, Anhydrous — Wt cryst solid. Most available oxygen on volume basis. Lithium Corp

191) 3,4-Lutidine (3,4-Dimethyl Pyridine) — Liquid int for Nih-7519 pain killer announced by Nat'l Institute of Health. Union Carbide Chem

192) Magnesium Aluminum Silicate — Attacote, fine-micron powder. Anticaking agent for fertilizers, resins. Min & Chem

193) Magnesium Zirconate — Powder. Electronic ceramics. Pure, uniform, controlled particle size. Zirconium Corp

194) Metal Suppressor — Amber-colored liquid hydrocarbon additive. Limits pro-oxidant effects of copper. Du Pont

195) Methionine Hydroxy Analog-Calcium Salt — MHA, powder. Methionine supplement, poultry feeds. 90% assay, lower cost source. Monsanto

196) p-Methoxy Benzenesulfonyl Chloride — Int for pharmaceuticals. Diamond

197) Methyl Butynoxy Ethanol — Liquid electroplating bath additive. Superior bright, level finish. Air Reduction

198) Methyl-ε-Caprolactone — Liquid. Polyester and urethane resins. No byproduct formation. Union Carbide Chem

199) Methyl Crotonate — Liquid chem int. Polymers with vinyl acetate. Eastman

200) Methyl Cyanopropionate — Liquid chem int. Rohm & Haas

201) N, N'-Methylene bis-Acrylamide — Cross linker. Stable, wt powder. MP 185. Am Cy

202) 2,2'-Methylene bis-(4-Ethyl-6-tert-Butyl Phenol) — Exp inhibitor 162. Wt solid. MP 126-7. Antioxidant for rubber, waxes, oils, polyethylene. Insol in water, sol in organic solvents. Am Cy

203) 2,2'-Methylene bis-(4-Methyl-6-tert-Butyl Phenol) — Antioxidant 2246. Cryst solid, MP 131. Rubbers, oils, waxes, polyethylene. Am Cy

204) Methyl Ethyl Ketone Peroxide — Lupersol Delta, liquid catalyst for polyesters. Faster gel, cure times at room temp. Lucidol W&T

205) 2-Methyl-2-Ethyl-1, 3-Propanediol — Solid. Lubricants, plasticizers, oil additives, polyesters, and pharmaceuticals. Increases thermal stability. Union Carbide Chem

206) 2-Methyl Furan — Liquid cyclic dienic ether. Quaker Oats

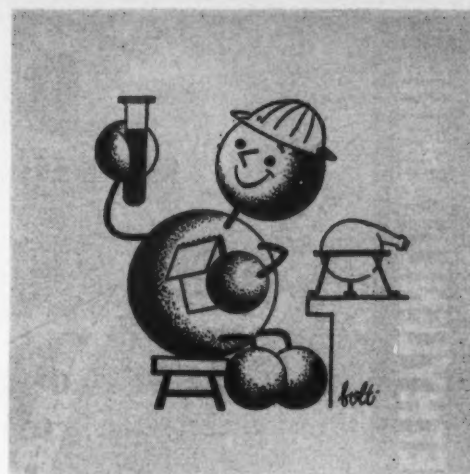
207) Methyl Isobutyrate — Liquid. Synthetic flavors. Eastman

208) N-Methylol Acrylamide — Wt solid monomer. Double bond polymerizes, methylol group cond. Am Cy

209) 2-Methyl Pentanoic Acid — Liquid branched six-carbon acid. Eastman

210) 2-Methyl Pentanal — Liquid int, six-carbon aldehyde. Eastman

211) 2-Methyl Pentanol — Liquid six-carbon alcohol for intermediate volatility plasticizers. Eastman



212) N-Methyl Pyrrole — Liquid stabilizer. Int chlorinated hydrocarbons. Ansul

213) 2-Methyl Tetrahydrofuran — Liquid int, cyclic ether. Quaker Oats

214) Micro Selective Adsorbent — Powder, extrusions. Gas, liquid dehydration. Selective separation of organics. High capacity. Davison—Grace

215) Mineral Attapulgit — Attagel 20, fine-micron powder thixotropic thickener, stabilizer—aqueous, organic systems. High surface area, inert, low cost. Min & Chem

216) Molybdenum Dichloride — Olefin poly catalyst, organo-metallic int. Climax

217) Molybdenum Hexacarbonyl — Acetylenic catalyst, int for organo-metallics, gas plating. Climax

218) Molybdenum Trichloride — Int for metal esters, organo-metallics. Polymerization of olefins. Climax

219) Mondur E-92 — Water emuls polyisocyanate for surface coatings. Mobay

220) Mono Methyl Hydrazine — Liquid rocket propellant. High performance. Olin Math

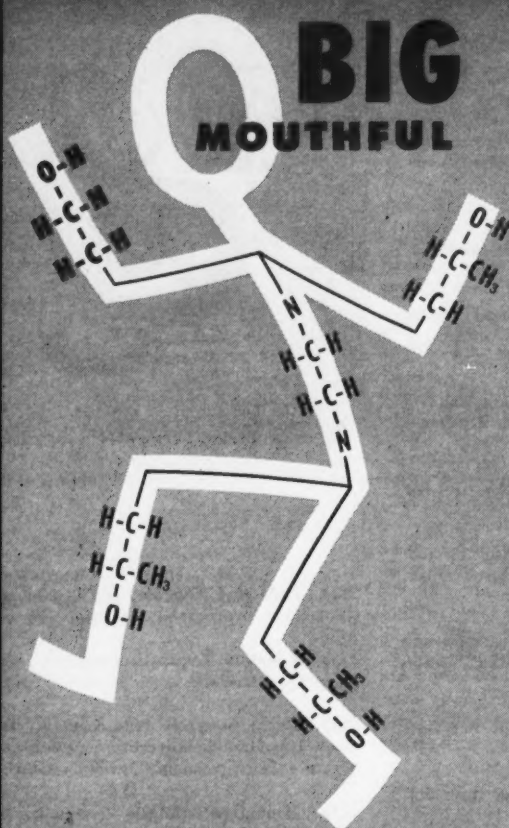
221) Morofin A-169 — Aq emuls of mixed non-ionic fatty acid esters. Wt paste textile softener. Full soft hand. Moretex

222) Moropol 762 — Aq nonionic emuls epoxidized glyceride. Wt paste textile softener, resin plasticizer. Soft hand, no wet soil pickup. Moretex

223) Myristic Acid Monoethanolamide — Loramine MY.228. Wt to ivory flakes. Perfume fixation in soap. Improves stability, shelf life, emollience. Croda

224) Myristoyl Peroxide — Gran powder catalyst for polymerization of vinyls, olefins. Long carbon chain length. Lucidol W&T

Continued on following page



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**... another Nalco oxyalkylation tool
for your research**

Monohydroxyethyltrihydroxypropylethylenediamine generally is pronounced "OH! OH!" around the Nalco Labs. In addition to six highly-reactive centers, the primary alcohol of the monohydroxyethyl group has considerably greater reactive properties than the three secondary alcohols of the hydroxypropyl groups—creating, in addition to other characteristics, greater water solubility than is offered by uniform hydroxypropyl groupings.

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CHEMICAL MATERIALS

Unless otherwise specified . . .
Pressures are mm Hg (abs)
Boiling Points are at 760 mm
Temperatures are in °C
Solubilities are at room temp

225) Neodymium Ethyl Sulfate
— Crystal. Electronics. City Chem

226) Niax Catalyst D-22 — Liquid cat for one-shot urethane foams. More active than amines. Union Carbide Chem

227) Niax Triol LHT-34 — High mw polyether for soft, flexible foams. Union Carbide Chem

228) Niax Triol LK-380 — Semi-vis liquid polyether for rigid urethane foams. High load bearing, low density, low moisture trans. Union Carbide Chem

229) Nickel Potassium Cyanide — Crystal. Electroplating. City Chem

230) Nickel Sodium Cyanide — Crystal. Electroplating. City Chem

231) Nonene — Propylene trimer, liquid int for det. Cosden

232) Non-lead Pearllescence — Paste. Pigmenting vinyls — tile, film, sheeting. Resists sulfide staining, light exposure. Claremont

233) Nonyl Phenol Polyethylene Glycol Ether — Tergitol Nonionic TP-9, colorless liquid all-purpose det, wetting agent. Good dispers, emuls prop. Cloud pt 51-56. Union Carbide Chem

234) Nylon Resin — Zytel 101-2315 molding powder. Broad molding range, good flow. Du Pont

235) Nylon Resin — Zytel 102X molding powder color stabilized. High color standard. Du Pont

236) Nylon Resin — Zytel 109 molding powder. Lower melt pt, fast cycles, low shrink. Du Pont

237) Nylon Resin — Zytel FE-2281 molding powder. Hydrolysis resistant. Du Pont

238) Odor Mask, Liquid — A-to-Z Odor Mask. Sol alcohol, kerosene, petroleum distillates. Efficient, versatile. D & O

239) Oleyl Imidazoline — Monamine OI, liquid. Emulsification in acid media. Mona

240) Organo-Silicone Fluid — XL-520. One-shot urethane foam surface active. Precise cell control. Silicones UCC

241) Perchloro Pentacyclodecane — Dechlorane, cryst solid. Gives fire resistance. Inert to acid, alkalis. MP 485. Hooker

242) Perfluorocyclobutane — Freon-C318, liquefied gas. Stable, non-toxic, non-flammable, odorless. Du Pont

243) Phenolic Resin, Heat Reactive — SP-12, lumps. Nitrile rubber adhesives. Bonds leather to leather or metal. Schenectady

244) Phenyl Isocyanate — Liquid pharm int, textile chemical. Carwin

245) N-Phenyl Piperazine — Liquid drug int. Union Carbide Chem

246) Phospho-12-Molybdic Acid — Petro catalyst, organic precipitant. Climax

247) Pine Oil Replacement — PX-1 antifoam. Liquid. Readily available year round, low cost, uniform. Hodag

248) Pluracol TP Triols — Polyoxypropylated deriv of trimethylolpropane. Urethane foam int, coatings, elastomers. Low cost. Wyandotte

249) Polyacrylamide — Wt, free-flowing powder. Binder, thickener, protective colloid. Water sol. Effective at pH 3-9. Am Cy

250) Polyester Molding Compd — Thermoflow T-105. Puttylike. High gloss, strength, heat resist. Atlas

251) Polyester Resin — PDL 7-893, liquid. Reinforced plastics. Short cure cycles. High surface gloss. Am Cy

252) Polyester Resin — PDL 7-899, liquid. Matched metal molding. Tough, resilient. Am Cy

253) Polyester Resin — Atlac L-382-13 styrene soln. Laminating, electrical. Resists steam sterilization. Taste, odor free. Atlas

254) Polyester Resin — Atlac 382-X2 styrene soln. Laminating, electrical. Fast, clear, uniform. Atlas

255) Polyester Resin — Emuls conc, Atlac 443, viscous liquid. Binder for glass mat. Controlled sol. Atlas

256) Polyethylene, Linear — Petrothene, granules. Density 0.94-0.96. Good film forming prop. U.S.I.

257) Polyethylene Resin — Alathon 15 extrusion powder. Coating foil, cellophane, etc. Resists moisture, abrasion. Du Pont

258) Polyethylene Resin — Alathon Super 25 extrusion powder. For plastic pipe with long-term strength, flexible, resists creep fracture. Du Pont

Check 2127 opposite last page

FOR EASY REFERENCE as to specific use, check convenient "Use-Index", page 32.

NAMES AND ADDRESSES of manufacturers, page 44.

CHEMICAL MATERIALS

259) MK-Polymer-Coated Glass Fabrics — Electrical insulation. Thermally stable @180+. Resists radiation. Du Pont

260) Polymeric Plasticizer — Harflex 305, mod viscous liquid. Vinyls, syn rubbers, methacrylates. Excel compat, non-migratory, permanent. Harchem W&T

261) Polymeric Plasticizer — Harflex 330, sl viscous liquid. Vinyls, syn rubbers, acetobutyrate. Low vol; resists fogging, migration. Permanent. Harchem W&T

262) Polyoxyethylene Alkyl Amine — G-3780-A. Liquid anti-static agent for textiles. Uniform, effective, compatible. Atlas

263) Polyoxopropylene (8) Sorbitol — G-2408, liquid int urethane foams. High functionality, stable, low vis. Atlas

264) Polyoxopropylene (10) Sorbitol — G-2410, liquid. Urethane foams, coatings, elastomers. Stable, high functionality. Atlas

265) Polysiloxane, Gellable — XF 1-0042. Potting electronic components. Transparent, self-healing gel. Dow Corning

266) Polystyrene Latexes, Modified — RWL-100, 106, 108. Latex, 36-40% solids. Polymer floor polishes. Small particle size, stable, high gloss. Morton

267) Polyurethane Foams — Hetrofoam liquids & solids. Rigid fire retardant foams. Hooker

268) Polyurethane Prepolymers — XP-1078, 1079, 1088. Adhesives, coatings, potting. High chem, abrasion, impact resistance, tough. Spencer Kellogg

269) Polyurethane Prepolymers — XP-1180, 1227, resinous solns. Finishes. Cure without cat; abrasion, chem resistance. Spencer Kellogg

270) Polyurethane Vehicles — XP-1197, 50% non-volatile soln in xylol. Finishes. Fast dry, early film hardness, water-alkali resistance. Spencer Kellogg

271) Polyvinyl Acetate — Vinac RP-250, powder. Pigment binder in joint cements, wood fillers, etc. Colton

272) Polyvinyl Acetate Emuls — Resyn 1031 dispersion base for adhesives. High mech stability, freeze-thaw resistant. Nat'l Starch

273) Polyvinyl Acetate Resin — Part hydrolyzed Resin D-381, granules. Adhesives, coatings, inks. Excel sol, adhesion. Shawinigan

274) Polyvinyl Chloride Paste Resin — PVC-DX70. Metal, fabric coating; slush molding; dip coating. Diamond

275) Polyvinyl Fluoride — Film 1-4 mils. Teslar PVF. Protective laminate, glazing. Resists weathering, chemicals. Du Pont

276) Polyvinyl Pyrrolidone — PVP K-15, low mw powder. Dispersant; Detergents; pigments; cosmetics. Gen'l Aniline

277) Potassium Binoxalate — Crystal. Int for cleaning cmpds, laundry sour. City Chem

278) Potassium Borohydride — Pellets. Fixed-bed removal of carbonyls & peroxides. Easy handling. Metal Hydrides

279) Potassium Sorbate — Dry cryst solid. Mold & yeast inhib. Does not affect color, taste, aroma. High water sol. Union Carbide Chem

280) Potassium Titanate, Fibrous — Lumps, blocks, loose, trowel material. High temp insulation. Low thermal conductivity. Du Pont

281) Praseodymium Ethyl Sulfate — Crystal. Electronics. City Chem

282) Primal White 1105, 1031 — Fluid pigment pastes for leather finishing. Good coverage. Rohm & Haas

283) Propionaldehyde — Liquid int: High mw resins; propionics; rubber accelerators. Eastman

284) B-O-N Red — Solfast Red BB CP-1378, powder. Printing inks. Blue-red shade. Light fast. Except tinting strength. Sherwin-Williams

285) B-O-N Red — Solfast Red Y CP-1376, powder. Printing inks. Yellowish-red shade, light fast, high tint strength. Sherwin-Williams

286) Release Agent — High mw liquid RA-4 for rigid, flexible foams. Fast drying. Nalco

287) Dialkylated Phenol, Condensed — Alcolgard 354 dispersion or powder. Protects rubber, latices from light, heat, ozone. Non-staining. Alco Oil

288) Rubber Lubricant — XLE-42, silicone emuls. Does not interfere with subsequent finishing. Silicones UCC

289) Samarium Ethyl Sulfate — Crystal. Electronics. City Chem

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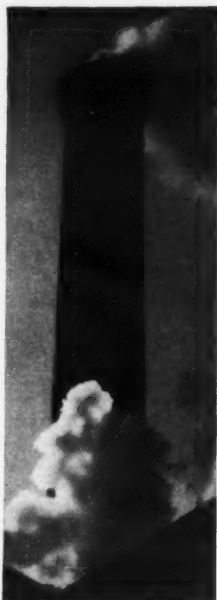
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CHEMICAL MATERIALS

290) Silico-12-Molybdic Acid — Petro catalyst, organic precipitant. Climax

291) Silicone Antifoams — F-1, F-2, FD-62, liquid & emuls. Rapid action, ease of dispersion. Hodag

292) Silicone Emuls — XLE-452. Surface active for urethane foams. Precise foam cell control. Silicones UCC

293) Silicone Resin — XR-630, vehicle for high-temp paints. Low-temp cure, heat resistance. Silicones UCC

294) Silicone Rubber Masterbatch — XKW-1300. Accurately predictable compd properties. Silicones UCC

295) Silicone Varnish — XR-622. High-temp electrical insulation. Low-temp cure. Silicones UCC

Unless otherwise specified . . .

Pressures are mm Hg (abs)
Boiling Points are at 760 mm
Temperatures are in °C
Solubilities are at room temp

296) Sodium Alginates — Kelco Gel HV, gran powder. Forms own reversible gel not subject to syneresis. Sol cold water. Kelgin W, gran powder—water flocculation. Keltone—food base gelling agent. Kelco

297) Sodium Aluminate Coagulant — 614, granular softening, clarifying agent. High Mg hardness reduction. Nalco

298) Sodium Borohydride — Pellets. Fixed bed carbonyl, peroxide reductions. Easy handling, dust free. Metal Hydrides

299) Sodium Borohydride — Stable water soln. Reduction of residual carbonyls. Low cost, stable. Metal Hydrides

300) Sodium Carbonate, Monohydrate — Cleaner, water softener. Uniform in composition, granulation. Diamond

301) Sodium Petroleum Sulfonate — Petrosul L-100, viscous liquid. High mw int for rust preventatives, motor oil detergents. High oil sol. Penn Refining

302) Sodium Polyacrylate — Alcogum AN-25 aq soln. Emuls stabilizer, viscosity mod. Stable. Alco Oil

303) Sodium Polyacrylate, Modified — Cyanamer A270, water-sol, anionic polymer soln. Thickener, stabilizer, pH 7.5. Clear. Am Cy

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CHEMICAL MATERIALS

304) Sodium Polyacrylate, Modified — Cyanamer A370, lt cream flakes. Water-sol thickener. Effective above pH 3. Am Cy

305) Sodium Zirconyl Sulfate — Zircotan T, dry powder. Tanning leather. Rohm & Haas

306) Solulans 97 & 98 — Liquid acetylated ethylene oxide derivatives of lanolin alcohols. Conditioning agents, emulsifiers—lotions & creams. Am Cholesterol

FOR EASY REFERENCE as to specific use, check convenient "Use-Index", page 32.

NAMES AND ADDRESSES of manufacturers, page 44.

307) Sorbitan Monooleate — At-pet 80, liquid. Corr inhib for oils. Ends lead corr problems. Atlas

308) Soybean Oil Epoxide — Flexol Plasticizer EPO, liquid stabilizer, plasticizer for PVC. Heat & light stable. Union Carbide Chem

309) Stearamidopropyl Dimethyl- β -Hydroxyethyl Ammonium Dihydrogen Phosphate — Catanac SP, 35% soln in isopropanol-water. Antistatic agent, emuls. Am Cy

310) Stearamidopropyl Dimethyl- β -Hydroxyethyl Ammonium Nitrate — Catanac SN, 65% paste in isopropanol-water. Antistatic agent, cationic emuls. Am Cy

311) Stearyl Dimethyl Benzyl Ammonium Chloride — Siposan HCE, 25% liquid, 98% powder. Hair cond. Good color, odor. Am Alcolac

312) Stearyl Ester of Dimethyl Polysiloxane — F-157. Cosmetic ingredient, wax like. Compatible with organics. Dow Corning

313) Stilbene Derivative — Blanchophor SC-96 powder. Optical brightener for cellulose, nylon. Stable to hypochlorite bleach. Gen'l Aniline

314) Styrene Based Cation Exchange Resin — Nalcite HCR-W, spheres. Wt, stable, high capacity. Nalco

315) Styrene Butadiene Copolymer — Plioflex 1508, bales. Shoe soles, mech rubber goods. Excel physical prop, color. Goodyear

316) Styrene Butadiene Copolymer — Plioflex 1713, bales. Mech rubber goods, floor tile. 50-part oil extended. Excel color. Goodyear



CHEMICALS and PLASTICS

FMC Chemicals & Plastics Division offers a series of mono- and di-epoxides — materials which are finding diverse applications in epoxy resin formulations, as crosslinking agents for vinyl and acrylic polymers, for the synthesis of surface-active materials, de-emulsifiers, polyurethanes, lubricant additives, perfumery and flavoring materials, stabilizers, corrosion inhibitors, and as reactive intermediates.

Also available are a group of phosgene derived chemicals including urethane and ethyl chloroformate — materials of interest in the synthesis of pharmaceuticals, polycarbonates, specialty isocyanates and polyurethanes.

FMC Chemicals & Plastics Division produces

allylic monomers including DAPON® resin (diallyl phthalate) and DAPON® M resin (diallyl isophthalate) — materials with high electrical properties and unexcelled for molding and laminating applications especially where resistance to severe temperature and humidity conditions is needed.

The Division's complete line of OHIO-APEX plasticizers includes phthalates, phosphates, adipates, epoxies, fatty acid esters and specialties... in fact "A Plasticizer for Every Purpose."

Other chemicals available in commercial quantities include sublimed and resublimed anhydrous aluminum chloride, phosphorus oxychloride and trichloride and tributyl phosphate.

EPOXY CHEMICALS

Alpha-Pinene Oxide	Dicyclopentadiene Dioxide*	Limonene Monoxide (Dipentene Monoxide)
Butyl Epoxy Stearate	Dodecene Oxide	Methoxy Ethyl Epoxy Stearate
C ₁₂ -C ₁₈ Olefin Oxide	Limonene Dioxide*	Octylene Oxide

SPECIALTY CHEMICALS

Allyl Acetone	Methallyl Acetate
Aluminum Chloride, Anhydrous	Methallyl Alcohol*
Dimethyl Carbonate*	Methallyl Chloride
Diphenyl Carbonate*	Methyl Chloroformate
Ethyl Alpha-Allyl Acetoacetate	Phosphorus Oxychloride
Ethyl Carbamate (Urethane)	Phosphorus Trichloride
Ethyl Chloroformate	Tributyl Phosphate

RESINS

A-20 Epoxy Resin*	DAPON® (Diallyl Phthalate) Resin
DAPON® M (Diallyl Isophthalate) Resin	

ALLYL MONOMERS

Diallyl Adipate	Diallyl Isophthalate	Diallyl Maleate
Diallyl Diglycolate		Diallyl Phthalate

*In Development Quantities.

PLASTICIZERS

Product	Chemical Name
ADIPOL® 810	Isodecyl Octyl Adipate
ADIPOL® 10A	Di-Iso-Octyl Adipate
ADIPOL® BCA	Di-Butoxyethyl Adipate
ADIPOL® DIBA	Di-Iso-Butyl Adipate
ADIPOL® 2EH	Di-2-Ethylhexyl Adipate
ADIPOL® ODY	n-Octyl n-Decyl Adipate
ADIPOL® XX	Di-Isodecyl Adipate
Butyl Oleate	—
Butyl Stearate	—
Dibutyl Phthalate	—
Di "CARBITOL" Phthalate	Bis (Diethylene Glycol Monoethyl Ether) Phthalate
Di-Isodecyl Phthalate	—
Dinopol IDO	Isodecyl Octyl Phthalate
Dinopol MOP	Mixed Octyl Phthalates
Diocetyl Phthalate	—
D.I.O.P.	Di-Iso-Octyl Phthalate

(OHIO-APEX)

Product	Chemical Name
KAPSOL®	Methoxyethyl Oleate
KP-18	Primary Plasticizer
KP-20	Primary Plasticizer
KP-23	Butoxyethyl Stearate
KP-90	Epoxy Plasticizer
KP-140	Tri-Butoxyethyl Phosphate
KP-201	Dicyclohexyl Phthalate
KP-260	Primary Plasticizer
KRONISOL®	Di-Butoxyethyl Phthalate
KRONITEX® AA	Tricresyl Phosphate
KRONITEX® 1	Tricresyl Phosphate
KRONITEX® K-3	Tricresyl Phosphate
KRONITEX® MX	Cresyl Phenyl Phosphate
METHOX®	Di-Methoxyethyl Phthalate
OHOPLEX® Q10	Octyl Fatty Phthalic Acid Esters
OHOPLEX® R-9	Mixed Octyl Fatty Acid Esters
Tributyl Phosphate	—

EXPERIMENTAL PRODUCTS

FMC Chemicals & Plastics Division has considerable background and experience in the following fields: 1. Epoxy chemicals and epoxidation; 2. Phosgene derived chemicals (carbamates, chloroformates, carbonates); 3. Acetoacetic ester chemistry; 4. Allyl and methallyl compounds. We can in many cases supply small research samples of products in these general fields.

Write to FMC for complete technical data, price lists and availability information on the products listed above. We will be glad to discuss your special needs in any of our listed areas at your convenience.



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NAME		3218	My foamer is
TITLE			
COMPANY			
CITY	ZONE	STATE	
Oil system _____ Aqueous system _____ Food products _____ Other _____			

Check 2134 opposite last page

CHEMICAL MATERIALS

Unless otherwise specified . . .

Pressures are mm Hg (abs)
Boiling Points are at 760 mm
Temperatures are in °C
Solubilities are at room temp

317) Styrene Butadiene Copolymer — Plioflex 1714E, bales. Mech rubber goods, tires. 50-part oil extended. Goodyear

318) Sulfated Nonionics — Ethoxylated nonionics sulfated on term hydroxyl. Surface actives, polymerization emulsifiers, detergents. Stepan

319) Sulfonated Alkyl Aryl Polyether — Triton X-202. Wt creamy pourable liquid, 30%. Surface-active stabilizer for latices. Freeze-thaw stable. Rohm & Haas

320) α -Sulfopalmitic Acid — Powder detergent additive, flotation reagent. Bifunctional. Armour

321) α -Sulfostearic Acid — Powder. Detergent additive, flotation reagent. Bifunctional. Armour

322) Textex — Mod starch deriv, powder disintegrant for tablets. Fast. Nat'l Starch

323) Tallow Glyceride — Dar-Gly. Int for tallow alcohols, softeners. Color, odor stable. 1% max unsat. Darling

324) Tarnish-resistant Metallic Gold — Paste & semi-dry pigment for vinyls. Resists tarnishing by light, heat. Claremont

325) Terephthaloyl Chloride — Wt cryst solid. Int for monomers, polymers. Reactive. Diamond

326) Tetrachlorodifluoroethane — Freon-112. BP 92.8. Stable selective solvent, non-flammable. Du Pont

327) n-Tetradecanol — Cachalot M-44, myristyl alcohol. Chem int. Low iodine value. M. Michel

328) Tetrafluoroethylene, Resin-Bonded — Emralon solid-film lub. Two-pack system. Tough, resists corrosion. Acheson

329) N,N,N',N'-Tetramethyl-1,3-Butane Diamine — Colorless, stable, liquid urethane foam catalyst. Water sol, fast cure, low odor. Union Carbide Chem

330) Tetramethyl Ethylene Diamine — 70% aq soln. Int for quaternary ammonium c m p d s. Rohm & Haas

331) Tetrapropenyl Succinic Anhydride — Viscous liquid. Epoxy curing agent. Int corr inhib, lubs, surface actives. Reactive double bond, anhydride. Monsanto

332) Textile Softener — XLE-48, silicone emuls. Softener for resintreated textiles. No wet soiling. Silicones UCC

333) β , β' -Thiodipropionic Acid — Wt crystals. MP 134. Antioxi-dant, chem int. Am Cy

334) β , β' -Thiodipropionitrile — Wt crystals. Selective solvent, int. Sl sol water; sol organics. Am Cy

335) Thioglycol Diacetate — Liquid solvent, chem int for polyesters. Union Carbide Chem

336) Toly Xyl Sulfone — Colorless, mobile liquid. Heat trans fluid, plasticizer, resin additive, int. Stable sulfone. Monsanto

337) Triallyl Cyanurate — Liquid or solid. FP 27. Copolymer or homopolymer. Active. Gives abra-sion resistance. Am Cy

338) Tributyl-2,4-Dichloro Ben-zylphosphonium Chloride — Phos-fon-D, 10% dust. Plant growth retardant. Virginia-Carolina

339) Tricaprylyl Amine — Alamine 336. Solvent extraction of uranium, other metals from acid media. Water insol. Gen'l Mills—Chem

340) Tricaprylyl Monomethyl Ammonium Chloride — Aliquat 336. Solvent extraction of uranium, other metals from alkali media. Water insol, liquid at 75%. Gen'l Mills—Chem

341) Triethylene Diamine — Dabco, wt cryst solid. Urethane foam catalyst. Lacks steric hindrants. Houdry

342) m-Trifluoro Methylphenol — Liquid chem int. Maumee

343) Trimellitic Anhydride — Solid. Int for coatings, polyurethanes, polyesters, epoxies. Tri-functionality. Amoco

344) Trimethylol Propane Diallyl Ether — Liquid int for coatings, adhesives, urethanes. Bifunctional. Celanese

345) Trimethylol Propane Monoallyl Ether — Liquid int for coatings, adhesives, urethanes. Bifunctional. Celanese

346) 2,2,4-Trimethyl Pentanol — Liquid. Lubricants and oil additives. Imparts thermal stability. Union Carbide Chem

347) 2,2,4-Trimethyl Pentanol — Liquid int for high temp lube bases, ester plasticizers. Eastman

348) Tris 1-Aziridinyl Phosphine Oxide — APO, 85% soln in ethanol. Textile crease resistant, flame retardant, ink additive. Water, organic solvent sol. Chemirad

CHEMICAL PROCESSING

FOR EASY REFERENCE as to specific use, check convenient "Use-Index", page 32.

NAMES AND ADDRESSES of manufacturers, page 44.

349) Tris 1-Aziridinyl Phosphine Sulfide — APS, 100% solid. Grease resistant, flame retardant. Water, organic solvent sol. Chemirad

350) Tris (Dichloro Propyl) Phosphate — Celluflex FR-2, liquid flame retardant for thermosetting and thermoplastic resins. Celanese

351) Tungsten Hexacarbonyl — Acetylenic catalyst, int for organo-metallics, gas plating. Climax

352) Tungsten Hexachloride — Polymerization catalyst, int for organo-tungstens, gas plating. Climax

353) Ucon Lubricants DLB-62-E, DLB-140-E, DLB-200-E — Liquid. Inert solvents, lubricants, hydraulic fluids, heat-transfer fluids. High load-bearing capacity. Union Carbide Chem

354) Uranium Dioxide — Reactor fuel elements. Uniform product. Spencer

355) Vinyl Acetate Homopolymer — Emuls coating of paper, textiles. Low vis, resists yellowing. Onyx Oil

356) Vinyl Acetate-Vinyl Stearate Copolymer — Flexbond 100, emuls. Paper, fabric coating & adhesive. High flexibility. Non-toxic. Colton

357) Vinyl Chloride Copolymer — PVC-DX82 powder. Internally plasticized PVC. Diamond

358) Vinyl Cyclohexane Dioxide — Epoxide 206. Condensation resins; polyglycols. Viscosity reduction. Union Carbide Chem

359) Vinyl Cyclohexane Monoxide — Copolymerization with epoxides yields polyglycols having unsaturation. Union Carbide Chem

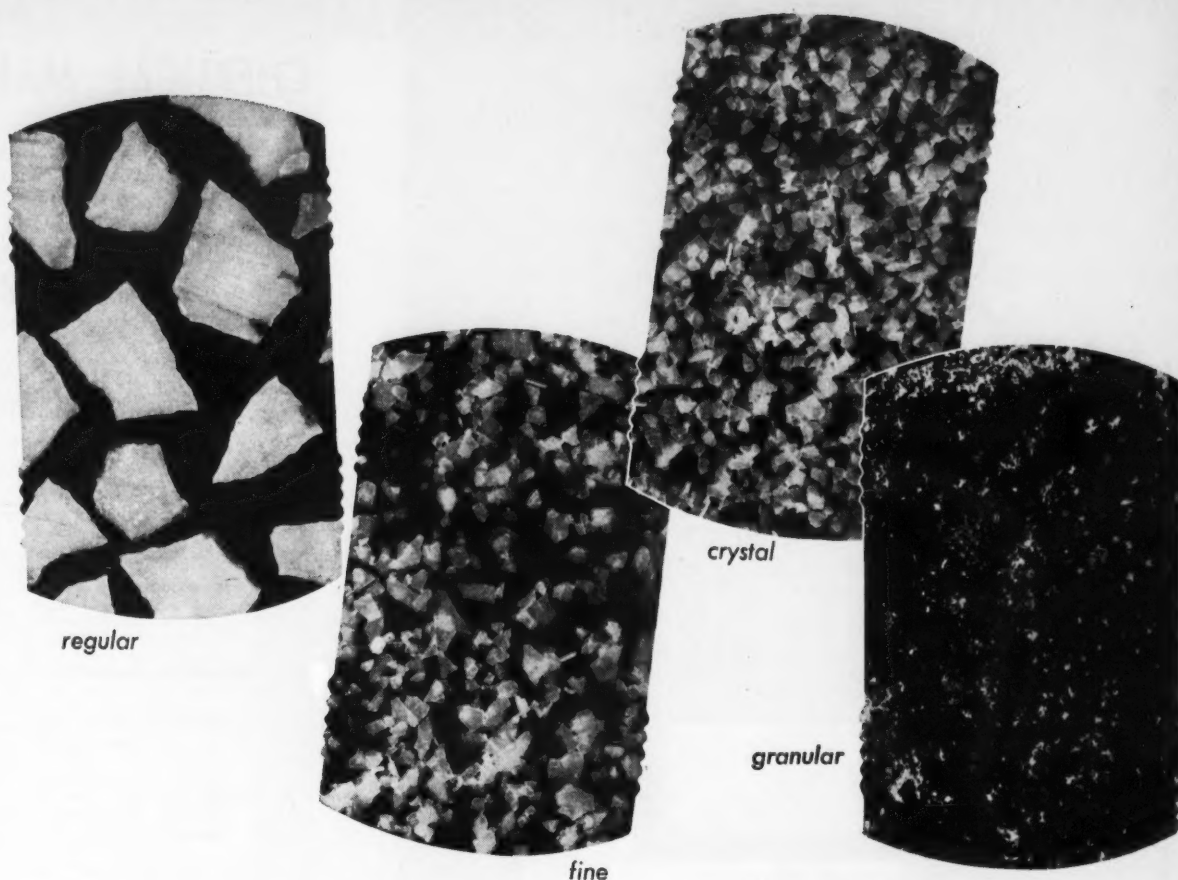
360) Vinylpyrrolidone — Vinyl Acetate Copolymer — PVP/VA S-630 powder. Adhesives, coatings, cosmetics. Broad solubility-aqueous or organic systems. Gen'l Aniline

361) o-Xylene — 99% liquid int. High purity. Cosden

362) Zein — G210, lt tan amorphous powder. Pigment binder; fabric, paper coating, sizing. Clear water soln with only slight alkalinity. Corn Products

363) Zerifac — Powder, 95% through 325 mesh. Epoxy filler. Zero coef of expansion. Foote

364) Zinc Molybdate — Crystal catalyst. City Chem



photos show actual size of flakes

Flake caustic soda: pick the size that's right for YOU

You have a better than average chance of getting the size that's just right for your product or process when you select from these *four* Hooker caustic soda flakes.

The *Regular*, *Fine*, and *Crystal* sizes are especially firm and nondusting, thanks to a tightly controlled flaking-screening process. They're just thick enough to take handling abuse or breakdown in transit, just thin

enough to dissolve rapidly into solution.

We'll be happy to send you samples and technical data. Write and tell us what sizes you're interested in.

If you use less than carload lots, ask your Hooker jobber to stock the sizes you need. If you are not familiar with the Hooker jobber in your area, we'll be glad to send you his name and address.

HOOKEER CHEMICAL CORPORATION

506 Forty-seventh Street, Niagara Falls, N. Y.

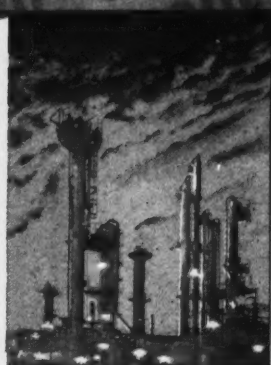
Sales Offices: Chicago, Ill.; Detroit, Mich.; Los Angeles, Calif.; New York, N. Y.; Niagara Falls, N. Y.; Philadelphia, Pa.; Tacoma, Wash.; Worcester, Mass. In Canada: Hooker Chemicals Limited, North Vancouver, B. C.



NIALK® CHEMICALS
OLDBURY® CHEMICALS
SHEA® CHEMICALS
DUREX® PLASTICS

Check 2135 opposite last page

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cresylics



A subsidiary of Consolidation Coal Company

FOR YOU!

...this brochure on
high purity CRESYLICS

Just published, this useful literature is complete with product descriptions, specifications, and suggested uses. One or more of Pitt-Consol's phenols, cresols or cresylic acids may lead you to reduced costs, improved production, new products.

For immediate reference consult our insert in Chemical Materials Catalog...To obtain your personal copy write us today.



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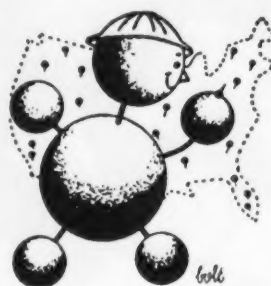
191 DOREMUS AVE. • NEWARK 5, N. J.

A subsidiary of Consolidation Coal Company

Use this list for locating . . .

CHEMICAL MANUFACTURERS

Here are full names and addresses of manufacturers of chemical materials described in listing starting on page 33. Use this directory when contacting them about their products.



Celanese Corporation of America,
180 Madison Ave., New York,
N. Y.

Chemirad Corporation, P. O. Box
96, Milltown, N. J.

Ciba Products Corporation, Kim-
berton, Pa.

City Chemical Corporation, 132
W. 22nd St., New York 11,
N. Y.

Claremont Pigment Dispersion
Corp., 39 Powerhouse Rd., Ros-
lyn Hts., L. I., N. Y.

Climax Molybdenum Company,
500 Fifth Ave., N. Y. 36, N. Y.

Abbott Laboratories, North Chica-
go, Ill.

Acheson Colloids Company, 1635
Washington Ave., Port Huron,
Mich.

Air Reduction Co., Inc., Air Re-
duction Chemical Div., 150 E.
42nd St., New York 17, N. Y.

Alco Oil & Chemical Corp., Tren-
ton Ave. & William St., Phila-
delphia 34, Pa.

Allied Chemical Corporation, Sol-
vay Process Division, 61 Broad-
way, New York 6, N. Y.

Aluminum Company of America,
1501 Alcoa Bldg., Pittsburgh 19,
Pennsylvania

American Alcolac Corporation,
3440 Fairfield Road, Baltimore
26, Maryland

American Cholesterol Products,
Inc., Talmadge Road, Edison,
N. J.

Atlas Powder Company, Wilming-
ton 99, Del.

American Cyanamid Company, In-
dustrial Chemicals Div., 30
Rockefeller Plaza, New York
20, N. Y.

American Cyanamid Company,
Plastics and Resins Div., 30
Rockefeller Plaza, New York
20, N. Y.

Amoco Chemicals Corporation,
910 S. Michigan Blvd., Chicago
5, Ill.

Ansul Chemical Company, 1 Stan-
ton St., Marinette, Wis.

Armour Chemical Div., 1355 W.
31st St., Chicago 7, Ill.

Godfrey L. Cabot, Inc., 77 Frank-
lin St., Boston, Mass.

The Carwin Company, Stiles Lane,
North Haven, Conn.

Colton Chemical Company, a Div.
of Air Reduction Co., Inc., 1747
Chester Ave., Cleveland 14,
Ohio

Columbia-Southern Chemical Cor-
poration, Subs. of Pittsburgh
Plate Glass Co., 632 Fort Du-
quesne Blvd., Pittsburgh 22, Pa.

Continental Oil Company, 1270
6th Ave., New York 20, N. Y.

Corn Products Sales Company, 350
5th Avenue, New York 1, N. Y.

Cosden Petroleum Corporation,
Box 1311, Big Spring, Texas

Cowles Chemical Company, 7106
Euclid Ave., Cleveland 13, Ohio

Croda Inc., 15 E. 26th St., New
York 10, N. Y.

Darling & Company, 4201 S. Ash-
land Ave., Chicago 9, Ill.

Diamond Alkali Company, 300
Union Commerce Bldg., Cleve-
land 14, Ohio

Dodge & Olcott, Inc., 180 Varick
St., New York 14, N. Y.

The Dow Chemical Company,
Midland, Mich.

Dow Corning Corporation, Mid-
land, Mich.

E. I. du Pont de Nemours & Co.,
Inc., Wilmington 98, Del.

Eastman Chemical Products, Inc.,
Subs. Eastman Kodak Co.,
Kingsport, Tenn.

Foote Mineral Co., 18 W. Chelton
Ave., Philadelphia 44, Pa.

General Aniline & Film Corp., An-
tara Chemicals Sales Div., 435
Hudson St., New York 14, N. Y.

General Mills, Inc., 2010 E. Hen-
nepin Ave., Minneapolis 13,
Minn.

To page 46

Check 2136 opposite last page

THAT'S INTERESTING

A-reactor makes bow

U. S. Industrial Chemicals Co. and nine other firms are now participating in experiments with world's largest nuclear reactor devoted solely to industrial research. Fields of interest include alcohol, chemicals, special metals, plastics, tobacco, machine tools, explosives, packaging, glass, lead, electronics, oil, and rubber.

And now— a 'flotel'

Syndicate of businessmen in East London, which is in South Africa, is planning a hotel on water on that town's Buffalo River. The "flotel," to accommodate 500 guests, in reality will be a converted ship. It will be anchored in the river. All nautical effects of the ship will be retained. The manager—you guessed it—will be called captain.

For more information on product at right, specify 2137 see information request blank opposite last page.

Which of these 3 products and services can you use from BECCO?



What's new in Metal Treatments and Etching?

Quite a few things. For example, there's the use of Becco Ammonium Persulfate in etching printed circuits. Seems the material works a lot better—at less cost—and with none of the hazards of the ferric chloride solutions conventionally used.

Then, there's the problem of pickling copper and brass. Lots of pickling agents will do this—only trouble is, you've got to paint or plate or do whatever you're going to do with the metal rather quickly. Or else. Or else it will tarnish or oxidize and you're in the pickle all over again.

Not so with Ammonium Persulfate. Cleans fine. Puts a mild etch on the surface, too, for better paint or plating bonding. More important, perhaps, is the fact that the metal resists retarnishing for up to two weeks. Ideas?

We hope so. What's more, we've got several booklets to help spur you on. They're free—use the coupon below to order.

No. 39 and 51—Surface Treatment of Metals with Peroxygen Compounds.

No. 86—Improving Properties of Copper and Brass Surfaces.

No. 97—Paddle Etching of Printed Circuits with Ammonium Persulfate.

No. 99—Tank Immersion Etching of Printed Circuits with Ammonium Persulfate.

No. 102—Etching of Printed Circuits with Mercury Activated Persulfate.



What's a PEROXYGEN?

Fact is, "peroxygen" is a word that Becco uses to indicate that we can tie oxygen onto just about anything.

How come? Well, years of experience in producing Hydrogen Peroxide has produced an affinity between Becco and oxygen—an affinity we have capitalized on to give you compounds that will provide a ready source of oxygen—wherever, however and whenever you need it.

We have a good number of such compounds on the shelves. Quite a few others are in development. Still others are merely in our minds, but we can begin drawing them out if you're interested.

We hope you are interested. But we'll never know—unless you fill in the coupon below and mail it to us. Why not?

Problems in handling Hydrogen Peroxide



Becco's Four-Fold Engineering Service Program—offered free—includes:

1. Comprehensive survey of your facilities.
2. Specific proposal with recommendation of proved equipment and where it is obtainable.
3. Installation supervision by Becco.
4. Periodic inspection and permanent service.

Can you use this free Becco help, based on more years of experience with bulk handling of H_2O_2 than any other manufacturer? Use the coupon to let us know.

BECCO 

BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo, New York

Dept. CP-E

Gentlemen:
Please send me the following free bulletins:

- ☐ 39 and 51 ☐ 86
☐ 97 ☐ 102 ☐ 99

NAME _____

FIRM _____

ADDRESS _____

CITY _____

ZONE _____ STATE _____

BECCO 

BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo, New York

Dept. CP-D

Gentlemen:
Send me more information about Becco Peroxygen Chemicals.

NAME _____

FIRM _____

ADDRESS _____

CITY _____

ZONE _____ STATE _____

BECCO 

BECCO CHEMICAL DIVISION, FMC
Station B, Buffalo, New York

Dept. CP-B

Gentlemen:
Please tell me more about your Four-Fold Engineering Service.

NAME _____

FIRM _____

ADDRESS _____

CITY _____

ZONE _____ STATE _____

at El Dorado

Uniformity is FOREMOST



SEE one drum and you've seen them all. Each drum of El Dorado coconut oil fatty acid or methyl ester looks, feels, tests and works like every other for the *purity* and *uniformity* of your formulations.

That's why El Dorado esters, acids and oils have been famous for quality and dependability for over 65 years . . . because at El Dorado, Uniformity is Foremost.

EXAMPLE: All Eldo Lauric 96 shipped last year exceeded 97% purity—the purest, most uniform Lauric Acid available.

Supplies stocked near you. Write or phone today for samples and specifications. Department B-2

FATTY ACIDS

Caprylic	Capric	Lauric
Myristic		Palmitic
Cocoleic	Eldhyco	Coconut

METHYL ESTERS

Caproate	Caprylate	Caprate
Laurate	Myristate	Palmitate
Oleate	Eldo* 18	Coconate

*T. M. REG.



**FOREMOST FOOD AND CHEMICAL
COMPANY**

P. O. Box 599, Oakland 4, California

Atlanta: Geo. E. Missbach & Co.	Boston: N. S. Wilson & Sons	Chicago: M. B. Sweet Company	Cincinnati: Howard Dock
Cleveland: F. W. Kamin Company	Detroit: Harry Holland & Son, Inc.	Houston: Joe Coulson Company	Kansas City: Vulcan Sales Company
Minneapolis: M. H. Baker Company	New Orleans: Brefreith & Sheahan Company	New York: H. Reisman Company	
Oakland: Foremost Food & Chemical Co.	Oklahoma City: Ruilman Brothers	St. Louis: Harry A. Baumstark & Company	

Check 2138 opposite last page

CHEMICAL MATERIALS

From page 44

The Goodyear Tire & Rubber Company, Akron 16, Ohio

W. R. Grace & Co., Davison Chemical Company Division, Baltimore 3, Maryland

Hercules Powder Co., 900 Market St., Wilmington 99, Del.

Hodag Chemical Corp., 7247 N. Central Park, Chicago 45, Ill.

Hooker Chemical Corporation, Niagara Falls, N. Y.

Houdry Process Corporation, 1528 Walnut St., Philadelphia 2, Pa.

J. M. Huber Corp., 630 3rd Ave., New York 17, N. Y.

Kelco Company, 120 Broadway, New York 5, N. Y.

Lithium Corporation of America, Inc., 1100 Title Insurance Bldg., Minneapolis 1, Minn.

Maumee Chemical Company, 2 Oak St., Toledo 5, Ohio

Metal Hydrides Inc., 12-24 Congress St., Beverly, Mass.

M. Michel and Company, Inc., 90 Broad St., New York 4, N. Y.

Minerals & Chemicals Corporation of America, Essex Turnpike, Menlo Park, N. J.

Mobay Chemical Co., 1815 Washington Road, Pittsburgh 34, Pa.

Mona Industries, Inc., P.O. Box 1786, Paterson 17, N. J.

Monsanto Chemical Co., 800 N. Lindbergh Blvd., St. Louis 66, Missouri

Moretex Chemical Products, Inc., 314 W. Henry St., P.O. Box 2528, Spartanburg, S. C.

Morton Chemical Company, 110 N. Wacker Drive, Chicago 6, Ill.

Nalco Chemical Company, 6216 W. 66th Place, Chicago 38, Ill.

National Lead Company, Research Laboratories, 105 York St., Brooklyn 1, N. Y.

National Starch Products, Inc., 750 Third Ave., New York 17, N. Y.

Olin Mathieson Chemical Corp., Organic Chemicals Div., 275 Winchester Ave., New Haven, Conn.

Onyx Oil & Chemical Co., 190 Warren St., Jersey City 2, N. J.

Pennsylvania Refining Co., Butler, Pennsylvania

The Quaker Oats Company, Merchandise Mart Plaza, Chicago 54, Ill.

Rohm & Haas Company, Washington Square, Philadelphia 5, Pa.

Schenectady Varnish Co., Inc., P.O. Box 1046, Schenectady, N. Y.

Dibutyl Sebacate

Outstandingly
Efficient

Plasticizer

odorless • tasteless • colorless

for use with
Vinyls
Cellulosics
Synthetic
Rubbers
Polymers

to prepare

Films and Sheet
Extruded Products
Solutions
Plastisols and
Organosols
Molded Products

Outstanding Performance Rating

- Excellent low temperature properties
- F.D.A. accepted
- Excellent ease of incorporation
- Very good heat blocking resistance
- Very good lubricity
- Low rate of extraction



THE FLAME AND THE FLASK
Symbol of Quality

Ask for information
about other
Plasticizers
available for
specific applications.

The C.P. Hall Co.
CHEMICAL MANUFACTURERS

5245 W. 73rd St., Chicago 38, Illinois
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MEMPHIS • LOS ANGELES

Check 2139 opposite last page

CHEMICAL PROCESSING

CHEMICAL MATERIALS

Shawinigan Resins, 644 Monsanto Ave., Springfield 1, Mass.

The Sherwin-Williams Co., 11541 S. Champlain Ave., Chicago 28, Ill.

Spencer Chemical Company, Dwight Bldg., Kansas City, Mo.

Spencer Kellogg and Sons, Inc., 98 Delaware Ave., Buffalo 5, N. Y.

Stauffer Chemical Company, 380 Madison Ave., New York 17, N. Y.

Stein Hall & Co., Inc., 285 Madison Ave., New York 17, N. Y.

Stepan Chemical Company, 427 W. Randolph St., Chicago 6, Ill.

Tamms Industries Co., 228 N. La-Salle St., Chicago 1, Ill.

Union Carbide Corporation, Silicones Division, 30 E. 42nd St., New York 17, N. Y.

Union Carbide Corporation, Union Carbide Chemicals Co. Div., 30 East 42nd St., New York 17, N. Y.

U. S. Industrial Chemicals Co., 99 Park Ave., New York, N. Y.

Velsicol Chemical Corp., 330 E. Grand Ave., Chicago 11, Ill.

Virginia-Carolina Chemical Corp., 818 Perry St., Richmond, Va.

Wallace & Tiernan, Inc., Harchem Div., 25 Main St., Belleville, N. J.

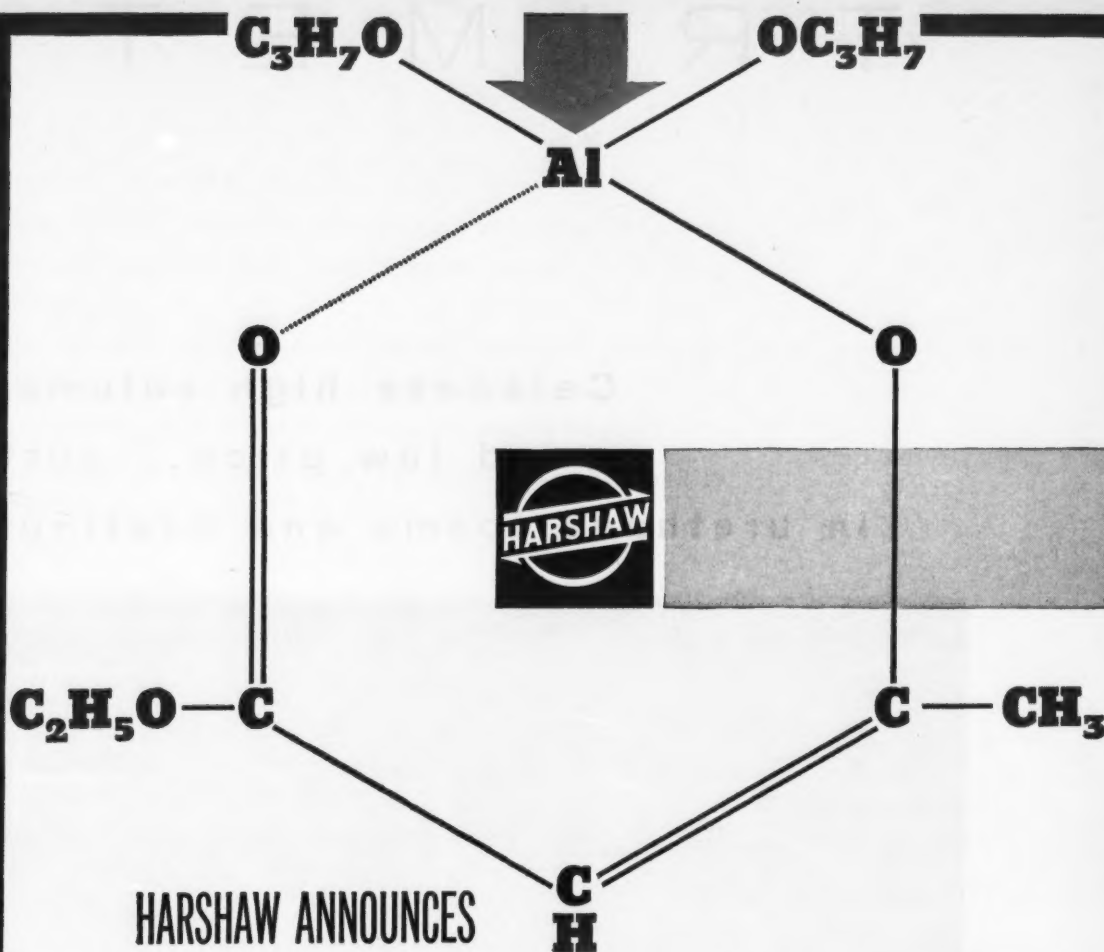
Wallace & Tiernan, Inc., Lucidol Div., 1740 Military Road, Buffalo 5, N. Y.

Wyandotte Chemicals Corporation, Wyandotte, Mich.

Zirconium Corporation of America, 31501 Solon Rd., Solon, Ohio



"In non-technical language, sir, your last idea was a turkey!"



aluminum chelate PEA-1

A NEW VERSATILE CHEMICAL WITH GREAT PROMISE

Uses already established for
**HARSHAW ALUMINUM
CHELATE ARE:**

1. Crosslinking Agent
2. Hydrophobic Intermediate
3. Drying Oil Modifying Agent
4. Adhesion Promoter

PROPERTIES

Formula Weight.....274.29
Color.....1-2 (Gardner Scale)
Viscosity... W-X (Gardner Scale)
Specific Gravity... 1.035 @ 25°C
Weight Per Gallon.....8.6

**The Harshaw Chemical Co. is the first commercial
producer of Aluminum Chelate in the United States.**

We have prepared a Technical Data Sheet which describes the characteristics of Harshaw Aluminum Chelate PEA-1, and also discusses suggested applications. A copy of this can be obtained by contacting the New Products Department, The Harshaw Chemical Company, Cleveland 6, Ohio.

THE HARSHAW CHEMICAL CO.

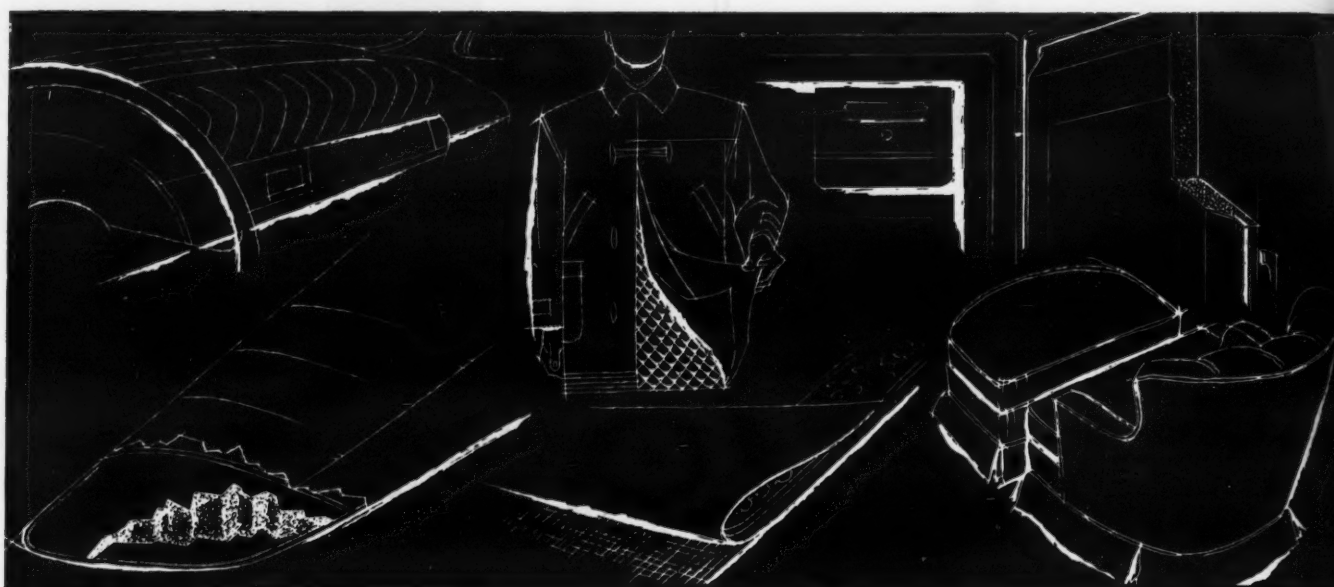
1945 East 97th Street • Cleveland 6, Ohio

Chicago • Cincinnati • Cleveland • Detroit • Houston • Los Angeles • Philadelphia • Pittsburgh • Hastings-On-Hudson

Check 2140 opposite last page

TRIMETHYL

Celanese high volume production
and low price...putting bounce
in urethane foams and coatings industries



Left to right:

- CRASH PADDING
- AIRCRAFT CONSTRUCTION
- CLOTHING INTERLINERS
- RUG UNDERLAYS
- REFRIGERATOR INSULATION
- FURNITURE CUSHIONING
- AUTOMOBILE CUSHIONING
- PROTECTIVE PACKAGING
- MATTRESSES AND PILLOWS
- ARCHITECTURAL PANELS

OLPROPANE

To make urethane foam, rigid or resilient, you need a polyol. This is where an increasing portion of Celanese' 15 million lbs. capacity of trimethylolpropane is going, and where the Celanese low price is helping manufacturers of urethane foams and coatings to flatten costs and meet the competition of other materials.

The same with alkyd resins—another end use where Celanese trimethylolpropane's high production and low price have enabled paint and coatings manufacturers to plan ahead with more confidence.

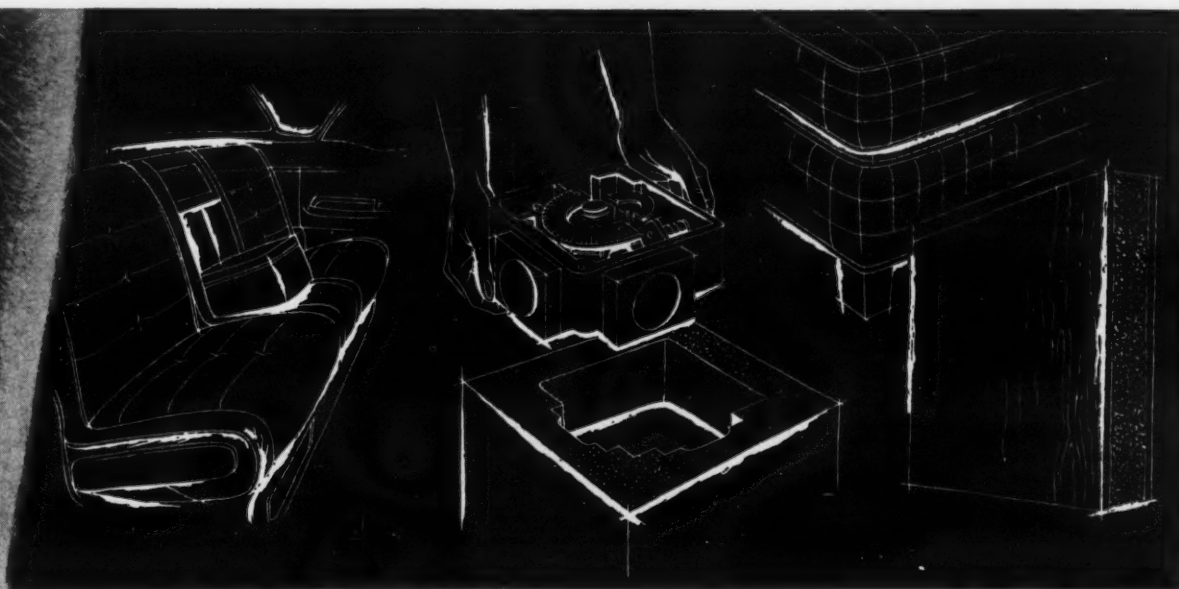
Giving dependability to your raw material supply source is a continuing program at Celanese.

Celanese Corporation of America, Chemical Division, Dept. 591-F, 180 Madison Ave., New York 16.

Canadian Affiliate: Canadian Chemical Company Limited, Montreal, Toronto, Vancouver.

Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Avenue, New York 16, N. Y.

Celanese®



For more information on product at left, specify 2141 see information request blank opposite last page.



HOW **HERCULES** HELPS...



"CLEAN UP, PAINT UP, FIX UP"...

Many of the nation's leading cities are currently observing "Clean-up, paint-up, fix-up" month. Hercules materials play an important role in the maintenance of homes and industrial buildings. Paints, thinners, disinfectants, cleaners, wallpaper are typical of finished products that depend on Hercules resins and other basic ingredients.

MAKE BETTER PRODUCTS...

A plastic reservoir and lid made from Pro-fax®, Hercules polypropylene, make the new Prak-T-Kal vaporizer-humidifier lightweight, virtually unbreakable, easy and safe to handle and store. The many superior qualities of Pro-fax are leading to the selection of this completely new plastic for many applications that previously could be met only by more costly materials.



HERCULES POWDER COMPANY

INCORPORATED

900 Market Street, Wilmington 99, Delaware

CHEMICAL MATERIALS FOR INDUSTRY

HERCULES



059-3

Check 2142 opposite last page

CHEMICAL MATERIALS

Heat distribution of 425°F with epoxy resin

Uses: In casting, laminating, and adhesive applications where high heat resistance is necessary.

Features: Epoxy resin exhibits resistance to temperatures as high as 500°F. Heat-distortion point is 425°F.

Description: Maximum deformation of resin is 0.01 in/in. In castings it has tensile strength of 10,700 psi at 77°F and 4500 psi at 300°F. Shrinkage is 0.0025 in/in.

As laminating resin, flexural strength is 41,000 psi at 400°F and 22,000 psi at 500°F. As adhesive sheer strength on aluminum-aluminum bond is 1380 psi at 500°F. Both aluminum-filled (617-A) and clear (617-C) types are available.

(Maraset resins, 617-A and 617-C, are product of Marbette Corporation, 37-31 30th St., Long Island City 1, N.Y.)

Check 2143 opposite last page.

Stable slimicide complex resists deactivation

Uses: Paper-industry applications.

Features: Stable complex results in material's sustained killing properties and deactivation resistance. Polar properties make product water-soluble.

Description: Slimicide is a di-phenylmercuric ammonium propionate in which phenylmercury is bound in quaternary-type nitrogen complex. Complex imparts polar properties to normally hydrophobic phenylmercuric radical.

At bleached-kraft mill test was conducted on a machine with the slimicide. Initial count showed 4000 organisms/ml. After 24 hours, machine was bright and clean. At end of week, after producing 305 tons of paper, count had been reduced to 2000 organisms/ml. (Metasol-L (liquid) and Metasol-P (solid) are products of Metasol Division, Metalsalts Corporation, 200 Wagaraw Rd., Hawthorne, N. J.)

Check 2144 opposite last page.

CHEMICAL PROCESSING

The last word in coal-tar derivatives

PORTRAYING THE INVISIBLE

Man has learned much about the molecule and the atom, but he has never seen them. Not even with the most powerful electron microscope. The benzene ring, for example, is customarily represented in the development of new chemicals by a diagrammatic symbol (right). Here, artist John Gaydos reaches out beyond the microscope's grasp to create an interpretation of the benzene ring. We see it as a tiny galaxy in the relative vastness of its surrounding cosmos.

Long established as a major branch of the chemical complex, coal tar derived chemicals continue to offer attractive opportunities to development chemists and process engineers alike. Some of the chemicals described on these pages are commercially new—and

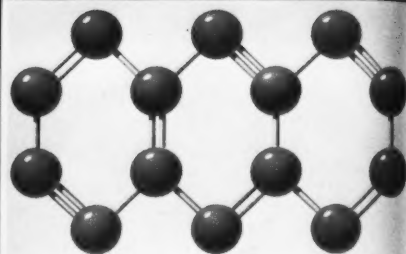
ELASTEX® PLASTICIZERS

Plastics and Coal Chemicals Division can control the quality of "ELASTEX" Plasticizers, because they are manufactured from Allied Chemical's basic materials. Plasticizers which are liquid in form can be shipped to you by express tank truck from any of 12 key cities.

Dimethyl Phthalate*
Dibutyl Phthalate*

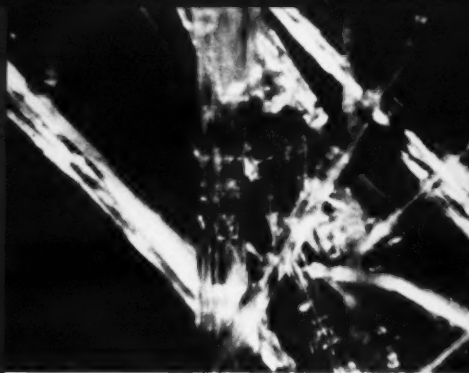
"ELASTEX" DCHP Plasticizer—Dicyclohexyl Phthalate
"ELASTEX" 10-P Plasticizer*—(Diisooctyl Phthalate) (DIOP)
"ELASTEX" 28-P Plasticizer*—Di-2-Ethylhexyl Phthalate (DOP)
"ELASTEX" 18-P Plasticizer*—Isooctyl Isodecyl Phthalate
"ELASTEX" 20-A Plasticizer*—Diisodecyl Adipate
"ELASTEX" 40-P Plasticizer*—Butyl Isodecyl Phthalate
"ELASTEX" 48-P Plasticizer*—Butyl Octyl Phthalate
"ELASTEX" 50-B Plasticizer*—Butyl Cyclohexyl Phthalate
"ELASTEX" 60-A Plasticizer*—Di-2-Ethylhexyl Adipate
"ELASTEX" 82-P Plasticizer*—Normal Octyl-Normal Decyl Phthalate
"ELASTEX" 90-P Plasticizer*—Diisodecyl Phthalate (DIDP)
"ELASTEX" 36-R Plasticizer*—Medium molecular weight polymeric plasticizer
"ELASTEX" 37-R Plasticizer*—High molecular weight polymeric plasticizer
Plasticizer 136*—An aryl alkyl hydrocarbon
* Available in Tank Cars and Trucks

ANTHRACENE



A well-known coal-tar constituent, anthracene is now available commercially from a domestic source. It has already found application as an intermediate in the manufacture of anthraquinone dyes. It undergoes both the Diels Alder and Friedel-Crafts reactions . . . can be reduced, nitrated, sulfonated and reacted with halogens . . . has remarkable photosensitive properties. Anthracene may prove an attractive starting point for materials now being produced by other methods. And it may open commercial possibilities for derivatives of yet undetermined potential.

ALLIED CHEMICAL PHTHALIC ANHYDRIDE



This crystal, magnified 100 times, is phthalic anhydride—starting material for alkyd resins, plasticizers, polyesters and a host of chemicals and pharmaceuticals. As the largest producer of phthalic anhydride, Plastics and Coal Chemicals Division has pioneered in development and standardization. A new standard of purity for Allied Chemical Phthalic Anhydride was recently announced, establishing its purity at 99.7 mole per cent minimum.

ACETOPHENONE (C₆H₅COCH₃)

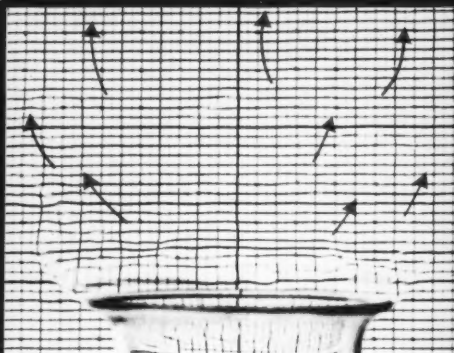
A valuable intermediate, acetophenone is used in the manufacture of drugs, resins, dyestuffs and inks. It is also an effective extraction and process solvent. Its structure, related to many commercially valuable organics, suggests an excellent potential in synthesis applications.

ETHYL- BENZENE (C₆H₅CH₂CH₃)

Though its principal use is the manufacture of styrene monomer, ethylbenzene is finding growing applications as an intermediate in organic synthesis and the production of synthetic dyestuffs. It is also a solvent for synthetic resins and a diluent for lacquers. It can be used as a heat-transfer medium and as a dielectric.

you may be the first to exploit them. Others are recognized staples of chemical processing, included here to acquaint you with the growing line of the world's largest producer of coal-tar chemicals ... *Plastics and Coal Chemicals Division of Allied Chemical.*

ALLIED CHEMICAL INDUSTRIAL AROMATIC SOLVENTS



Plastics and Coal Chemicals Division has led the way in establishing standard testing methods and specifications for light oil distillates. This work has paid off in the higher reliability of Allied Chemical Aromatic Solvents.

Benzol, Nitration	Xylol, Nitration
Benzol, Industrial Pure	Xylol, Ten Degree
Benzol, Industrial, 90%	Xylol, Industrial
Benzene, Thiophene-free	Hi-Flash Solvent
Toluol, Nitration	1320 Oil
Toluol, Industrial Pure	Wire Enamel Solvent
All available in Tank Cars and Tank Trucks	

ALLIED CHEMICAL TAR BASES

This special class of refined coal chemicals includes pyridine, quinoline and related compounds. Recent developments indicate that their potentials in the field of industrial chemistry are just beginning to be realized.

Refined Pyridine 2A
Pyridine 10A
Pyridine 15A
Mixed Picolines 20A
Pyridine 30A
Mixed Lutidines
Tar Bases 50A
Refined Alpha Picoline 2A
Refined Beta Gamma Picoline
Refined Quinoline
Refined 2, 4 Lutidine
Special Refined Grades
Special Fractions

ALLIED CHEMICAL TAR ACIDS AND TAR ACID OILS

The phenols obtained from coal-tar distillates comprise a valuable group of manufacturing chemicals—the tar acids. Among them, you are likely to find acids to the exact degree of refinement you require. Tar Acid Oils are blends of tar acids and coal-tar neutral oils, selected to give varying phenol coefficient and ready emulsifiability.

Phenols
Phenol USP, Synthetic
Technical Phenol (all grades)
Phenol-Cresol Mixes
Phenol-Cresylic Mixes

Cresols
Cresol, USP
Ortho Cresol (ranging from 50% to 98% purity)
Metaparacresols
Resin Cresols
Special Cresol Fractions blended to order

Cresylic Acids
Mixtures of close-cut fractions blended to meet particular commercial requirements
Special Engine Cleaning Grades

Xylenols
Metaxylenol—45°C., 56°C. and 61.2°C. Min. M.P.
Crude and Refined Grades
Special Fractions

Tar Acid Oils
Percentage of Tar Acids ranging from 10 to 50.

PHTHALO- NITRILE



Above is a diagram of the phthalocyanine molecule, formed by a ring of four phthalonitrile molecules around a central atom of copper or some other metal. Starting with phthalonitrile, you can produce phthalocyanine dyes or a host of other new compounds deserving investigation. Since phthalonitrile is now available, developments involving it can be put to immediately profitable use.

Get the last word in coal-tar derivatives

For the convenience of purchasing people in specific chemical industries, we have compiled helpful product data on an industry-by-industry basis. You can have this data by filling out the coupon below, telling us what industry you're working in. You'll find it an important assist in keeping all our resources at your fingertips.

PLASTICS AND COAL CHEMICALS DIVISION

40 Rector Street, New York 6, N. Y.

In Canada: Allied Chemical Canada, Ltd., 1450 City Councillors St., Montreal

**Allied
Chemical**

ALLIED CHEMICAL NAPHTHALENE

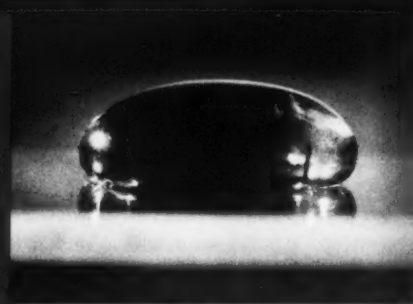
Comes in six convenient forms: ball, flake, ring, chipped, crushed and liquid. Suits requirements for insecticides, tanning agents, dyestuff intermediates, pharmaceuticals, phthalic anhydride and other industrial chemicals. Crude naphthalene also available in tank cars and tank trucks.

ALLIED CHEMICAL NIACIN USP

The finest Niacin available, specifically intended for pharmaceuticals, animal and poultry feeds and the enrichment of flour. Blends with soy flour available for the manufacture of vitamin premixes. Produced to meet the highest standard of purity through basic position in raw materials and the most modern equipment — conforms to USP specifications. Can be ordered from our manufacturing plant in Philadelphia and warehouses at Los Angeles and Chicago.

CUMAR® RESINS

One of the earliest developments in synthetic resins, these paracoumarone-indene resins continue to find broad markets in a dozen industries. They are available in nine separate grades for use in varnishes, floor tile, natural and synthetic rubber products, printing ink, adhesives and waterproofing materials. They are also used in the leather, electrical, radio, and paper industries.



OTHER CHEMICALS AND PRODUCTS OFFERED BY THE PLASTICS AND COAL CHEMICALS DIVISION

- Maleic Anhydride
- Fumaric Acid
- Resin S (A neutral synthetic resin of high styrene content)
- Specialized Rubber Compounding Materials
- "A-C" Polyethylene Lubricants
- Acetone
- Ethylene Glycol
- Diethylene Glycol
- Monoethanolamine
- Diethanolamine
- Triethanolamine
- Flotation Agents
- Pickling Inhibitors
- Tar Distillates

CUMENE

Though used principally in the manufacture of phenol, cumene can be employed in the production of alpha methyl styrene by catalytic dehydrogenation... as a constituent of aviation gasoline... and in other areas of chemical synthesis.

CUMYL PHENOL

This high-purity aromatic has interesting potential as an intermediate. It has been used to produce synthetic resins, insecticides and lubricating oil additives. Like so many commercial aromatics, cumyl phenol poses a challenge to development chemists.

PLASTICS AND COAL CHEMICALS DIVISION,
Allied Chemical Corp., 40 Rector Street, New York 6, N. Y.

Please send me specific product data for:

- ☐ Rubber Industry ☐ Paint Industry
- ☐ Plastics Industry ☐ Soap and Specialties Industry
- ☐ Technical data and laboratory samples

of _____ for investigation.

NAME _____

POSITION _____

COMPANY _____

ADDRESS _____

**Asbestos fiber**

... shown at left is whiter than conventional fiber at right. Fiber is also said to have low iron content, low grit content, and uniform fiber length.

(Asbestos fiber 7RF-7 is product of Carey-Canadian Mines, Ltd., Subsidiary of The Philip Carey Mfg. Company, Wayne Ave. at Cooper, Cincinnati 15, Ohio.)

Check 2145 opposite last page.

Caking not given chance by inert non-toxic agent

Uses: Coating prilled, granular, and explosives grade ammonium nitrate; ammonium sulfate; and resins such as phenol-formaldehyde.

Features: Anti-caking agent is inert and non-toxic.

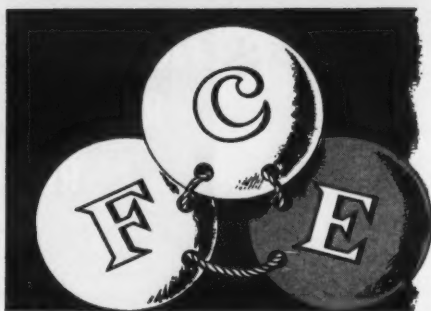
Description: Agent, which is a magnesium aluminum silicate, has desiccant properties which result from needle-like particle structure and corresponding large surface area. Low bulk density gives it high covering power.

Anti-caking agent is available in 50-lb multiwall, plain or asphalt laminated paper bags. It is available in both standard and modified grades. (Latter meets ammonia-release specification of 0.025 gm NH_3 per 25 gm.)

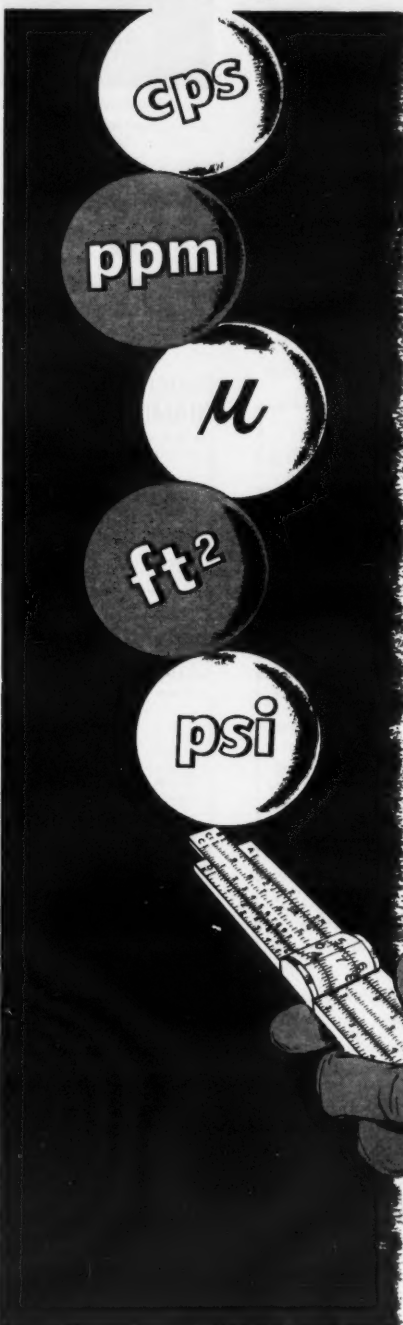
(Attacote (standard) and Attacote "C" (modified) are products of Minerals & Chemicals Corporation of America, Menlo Park, N. J.)

Check 2146 opposite last page.

For more information on product at left, specify 2147 ... see information request blank opposite last page.



...to get the right answers for your filtration



This balancing act is essential

If you want optimum FLOWRATE, CLARITY and ECONOMY, "standard" recommendations are not your answer, because your filtration operations are probably a little different from any other. 99 times out of 100, one of the standard grades of Dicalite Filteraids will give you the clarity you require, economically, at fast flowrates. If not, one of the special grades will. But the real problem is to determine just which filteraid *best* meets your particular situation.

That's where your Dicalite service engineer comes in. Thoroughly versed in the unique science of filtration engineering, he brings to your operation both his technical skills and his first-hand experience with thousands of filtrations. His specialized knowledge charts a direct path among a host of variable factors. Often he is able to diagnose a problem on first hearing and to make correct recommendations. He works closely with your own technical staff and production people—in your own plant, if you wish. And, if your problem demands more extensive work, the research facilities of the Dicalite laboratories are at his—and your—disposal.

If you have been wondering about your own filtrations, why not call in this Dicalite expert ... there's no obligation. Just call or write:

Dependable
GLC
GREAT LAKES **Dicalite**[®]
DIATOMACEOUS MATERIALS

DICALITE DEPARTMENT, Great Lakes Carbon Corp.,
612 So. Flower St., Los Angeles 17, Calif.

Check 2148 opposite last page

CHEMICAL MATERIALS

Continuous use at 500°F with surface coating

Uses: Coating of printed-circuit boards, electronic circuits and components, metals, and ceramics.

Features: Coating can be used continuously at 500°F and for short periods up to 600°F.

Description: Surface resistivity of epoxy coating is above 10^{15} ohms at room temperature and remains at approximately 10^{14} ohms, even at 500°F. Adhesion to a wide variety of materials is good.

(Eccocoat C 26 is product of Emerson & Cuming, Inc., 869 Washington St., Canton, Mass.)

Check 2149 opposite last page.

Metal finishes fully dried in 30 minutes

Uses: Short-oil alkyd resin is used with Parlon chlorinated rubber in formulation of metal finishes.

Features: Product finishes formulated with resin have tack-free drying times of 30 minutes.

Description: Short-oil alkyd resin produces finishes with abrasion resistance. It is available in solution in xylene at 60% non-volatile (604-60X). Properties of a typical solution are as follows:

Type alkyd	Oxidizing
Viscosity at 25°C (Gardner-Holdt)	Z1
Color (Gardner, 1933)	5-6
Acid number (solids)	10
Weight/gal, lb	8.3

(Cellolyn 604 and 604-60X are products of Hercules Powder Company, Incorporated, Wilmington 99, Del.)

Check 2150 opposite last page.

Yellow-dye fastness of 3 with cotton and rayon

Uses: For cellulosic fibers and in screen and machine printing. Dyestuff can be used in combination with blue shades to produce bright greens.

Features: Yellow dyestuff has light-fastness rating of 3

PRODUCT OR PROCESS

a General Mills **Fatty Nitrogen***
Chemical may improve it!

General Mills—FATTY NITRILES RCN

Product	Description	Percent Nitrile (Minimum)	Iodine Value
Alitrite 21D	distilled coconut oil nitrile	95	16 max.
Alitrite 7D	distilled stearyl nitrile	95	5 max.

General Mills—FATTY PRIMARY AMINES RNH₂

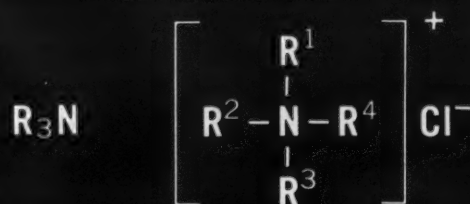
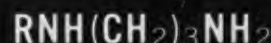
Product		Primary Amine Content (%) (Minimum)	Amine Number† (Minimum)	Iodine Value
Alamine 4	primary lauryl amine	87	270	2 max.
Alamine 4D	distilled primary lauryl amine	97	294	2 max.
Alamine 6	primary palmityl amine	87	207	3 max.
Alamine 6D	distilled primary palmityl amine	97	222	3 max.
Alamine 11	primary oleyl amine	87	189	70 min.
Alamine 11D	distilled primary oleyl amine	97	203	70 min.
Alamine 21	primary coconut oil amine	87	250	16 max.
Alamine 21D	distilled primary coconut oil amine	97	272	16 max.
Alamine 26	primary tallow amine	87	192	43-50
Alamine 26D	distilled primary tallow amine	97	207	43-50
Alamine H26	primary hydrogenated tallow amine	87	192	6 max.
Alamine H26D	distilled primary hydrogenated tallow amine	97	207	6 max.
Alamine 7	primary stearylamine	87	186	6 max.
Alamine 7D	distilled primary stearylamine	97	202	6 max.
Alamine 33	primary cottonseed oil amine	87	192	65 min.
Alamine 33D	distilled primary cottonseed oil amine	97	207	65 min.
Alamine 34	primary soybean oil amine	87	192	85 min.
Alamine 46	mixed amines	60	150	20 min.

General Mills—FATTY SECONDARY AMINES R₂NH

Product		Secondary Amine Content (%) (Minimum)	Iodine Value
Alamine 221	secondary coconut oil amine	85	16 max.
Alamine H226	secondary hydrogenated tallow amine	85	12 max.

†mg KOH equivalent to 1 gram of amine

* Fatty Nitrogen Chemicals



Above left, fatty primary amine; above right, fatty secondary amine; center, fatty diamine; lower left, fatty tertiary amine; lower right, fatty quaternary ammonium chloride.

General Mills—N-FATTY 1, 3-PROPYLENE DIAMINES RNH(CH₂)₃NH₂

Product & Description	Amine Number	Water Content	Melting Range
Diam 21 N-coco 1, 3-propylene diamine	375 min.	2% max.	20-25°C
Diam 21D Distilled N-coco 1, 3-propylene diamine	390 min.	2% max.	25-30°C
Diam 26 N-tallow 1, 3-propylene diamine	285 min.	2% max.	43-47°C

General Mills—FATTY QUATERNARY AMMONIUM CHLORIDES RN(CH₃)₃⁺Cl⁻ or R₂N(CH₃)₂⁺Cl⁻

Product	Description	Percent Quaternary Ammonium Compound	Percent Sodium Chloride	pH
Aliquat 4	lauryl trimethyl ammonium chloride	48-52	1 max.	9 max.
Aliquat 6	palmityltrimethyl ammonium chloride	48-52	1 max.	9 max.
Aliquat 21	coco trimethyl ammonium chloride	48-52	1 max.	9 max.
Aliquat 26	montallow trimethyl ammonium chloride	48-52	1 max.	9 max.
Aliquat 221	dicoco dimethyl ammonium chloride	73-77	0.5 max.	9 max.
Aliquat H226	dihydrogenated tallow dimethyl ammonium chloride	73-77	0.5 max.	9 max.
Aliquat 400	1:1 mixture Aliquats 26 and 221	48-52	1 max.	9 max.

General Mills—FATTY AMINE ACETATES RNH⁺CH₃COO⁻

Product	Description	Amine Value (Minimum)	Percent Neutralization	Iodine Value
Alamac 21	primary coconut oil amine acetate	191	97-103	10 max.
Alamac 21D	distilled primary coconut oil amine acetate	204	97-103	10 max.
Alamac 26	primary tallow amine acetate	154	97-103	35-45
Alamac 26D	distilled primary tallow amine acetate	164	97-103	35-45
Alamac H26	primary hydrogenated tallow amine acetate	152	97-103	5 max.
Alamac H26D	distilled primary hydrogenated tallow amine acetate	162	97-103	5 max.
Alamac 7D	distilled primary stearylamine acetate	159	97-103	5 max.

**General Mills Fatty Nitrogen
Chemicals can answer your
requirements as:**

corrosion inhibitors in crude oil production, oil refining and transportation and in secondary oil recovery. *Diamines and quaternary ammonium compounds* are used extensively in the petroleum industry.

flotation agents in recovery of phosphate, feldspar, potash, mica and quartz ores. *Primary amines* adsorb on the minerals, providing an hydrophobic film that enables attachment to air bubbles, floating minerals to the surface.

mold release agents for hard rubber curing. *Primary amines* speed curing and reduce permeability of hard rubber products such as battery boxes.

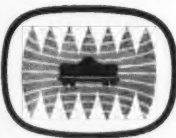
textile softeners for both home and commercial laundries. *Quaternary ammonium chlorides* soften fabrics, minimize static, speed the rate of dry, make ironing easier.

petroleum additives in engine fuels, lubricating and fuel oils. *Primary amines* and *diamines* prevent the formation of sludge and color bodies.

And *all* these fatty nitrogen chemicals are now being used in the chemical industry as reactive intermediates.

These are only a few proven applications of Fatty Nitrogen Chemicals. Your own experience and product requirements should suggest countless others. For a closer look at our complete line of on-stream Fatty Nitrogens, see the product specifications on the page at left.

Whether yours is a product or a process, write today for your FREE booklet, Fatty Nitrogen Derivatives.
Address: Dept. CP6



CREATIVE CHEMISTRY FROM GENERAL MILLS SERVES INDUSTRY WORLD-WIDE

CHEMICAL DIVISION

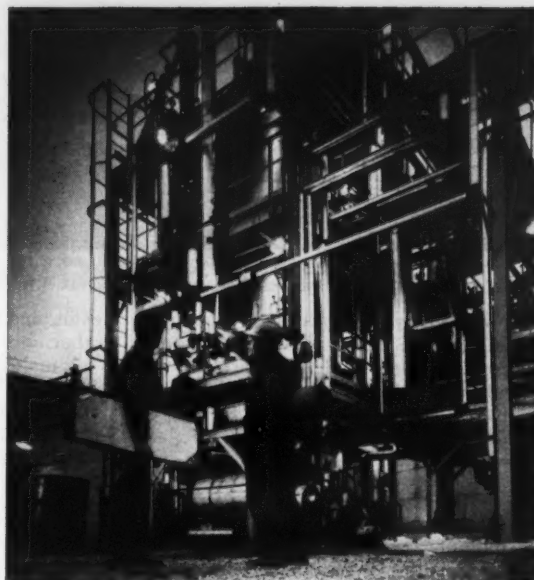
KANKAKEE, ILLINOIS

SALES OFFICES: New York, Boston, Philadelphia, Charlotte, Chicago, Kankakee, Houston, Los Angeles, San Francisco.

Versamid Polyamide Resins • Genamid Epoxy Curing Agents • Fatty Nitrogen Chemicals
Deriphath Amphoteric Surfactants • Sterols

Alamacs, Allquats, Diams, Deriphaths, Alitries and Alamines are trade names of General Mills

Check 2151 opposite last page



Modern equipment like this is used in one stage of the production of fatty nitrogen chemicals to supply growing industrial demands. Shipped in 4,000 and 8,000 gallon tank cars, in 3,500 gallon tank trucks, and 55 gallon drums, these chemicals are *controlled* for minimum variation and maximum purity.

**These key properties make Fatty Nitrogens
extremely promising in many industries:**

- ☑ **SURFACE FILMING**—Fatty nitrogen derivatives adsorb on metal as a monomolecular film and protect the metal from corrosive environment.
- ☑ **SELECTIVE ADSORPTION**—Fatty amines preferentially adsorb on certain non-metallic mineral surface; this surface modification enables the separation of ore components.
- ☑ **CHEMICAL REACTIVITY**—The fatty nitrogen derivatives are unique building blocks for organic chemical synthesis.
- ☑ **SOLUBILITY**—The fatty nitrogen derivatives have characteristic solubilities in a wide variety of polar and non-polar solvents.
- ☑ **SURFACE ACTIVITY**—The fatty nitrogen derivatives are cationic emulsifiers, wetting agents and detergents.
- ☑ **BIOCIDAL ACTIVITY**—The fatty nitrogen derivatives inactivate certain bacteria, fungi and algae.
- ☑ **BASE EXCHANGE**—The fatty nitrogen derivatives can replace inorganic ions in clays to make the clays compatible with organic liquids.
- ☑ **LUBRICITY**—Fatty nitrogen derivatives, electrochemically adsorbed on fibers and fabrics, lubricate the individual fibers and confer softness.

**General
Mills**

CHEMICAL MATERIALS

on both rayon and cotton. Similar ratings are obtained for washing at 120°F.

Description: Direct yellow dyestuff has distinct fluorescent cast. Since maximum exhaustion can be obtained at 180°F, it is suitable for open jig application.

Product has solubility of 5. Light fastness gains up to 1½ points with use of urea formaldehyde and melamine formaldehyde crease resins.

(Diphenyl brilliant flavine 7GFF is product of Geigy Dyestuffs Division, Geigy Chemical Corporation, Box 430, Yonkers, N. Y.)

Check 2152 opposite last page.

**Enamels with alkyd resin
shrug off weather**

Uses: In lacquers and enamels. Particularly in baked automotive and appliance enamels.

Features: Resin improves weather durability of nitrocellulose-lacquer finishes. It may be used in high concentration as lacquer plasticizer without reducing hardness below acceptable levels.

Description: Short-oil non-drying alkyd resin, when used in appliance finish applications, permits greater choice in type and amount of melamine resin used.

In enamel formula with 30% melamine level, resin shows Sward hardness of 30 when baked for 20 minutes at 200°F. A 20-minute bake at 300°F produces hardness of 48. After 15-minute bake at 300°F, formula has flexibility rating of 10% on GE impact tester.

(Aroplaz 2580-X-60 is product of Resin and Plastics Division, Archer-Daniels-Midland Company, 700 Investors Bldg., Minneapolis 2, Minn.)

Check 2153 opposite last page.

Phenolic molding compound reinforced with Fiberglas is depicted in six-page pamphlet including design information and physical properties under various conditions. Pamphlet D 203 — Durez Plastics Division, Hooker Chemical Corporation, Box 344, Niagara Falls, N.Y.

Check 2154 opposite last page.

Progress Report...

CELLOSIZ HEC 4400

Ethylene oxide

Quality control

Making latex paints easier to use

Additives help those popular latex paints go on easily and spread well. Additives also increase shelf life in warehouse or store, improve pigment distribution, and give better resistance to temperature changes.

One important, effective thickener for latex paints is water-soluble, non-ionic CELLOSIZ Hydroxyethyl Cellulose 4400. Paint processors get better production schedules with CELLOSIZ HEC, because it goes into solution easily and quickly, and has low-foaming characteristics. It is possible to add CELLOSIZ WP-4400 directly to the pigment grind, and thus avoid preparation of a separate thickener solution. Clear, bright colors are obtained because color variations are eliminated or greatly reduced.

Stable viscosity, good scrub resistance and excellent flowout are other desirable features of latex paints compounded with CELLOSIZ WP-4400.

For more information on thickeners, plasticizers, dispersants, stabilizers, and other CARBIDE additives, check the coupon to get the booklet, "Chemicals for Resin Emulsions."

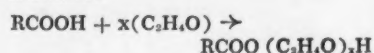
Nonionic detergents from ethylene oxide

Continuing demands for low-foaming detergents call for another look at ethylene oxide as an economical base for nonionic surfactants.

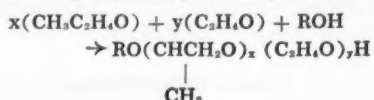
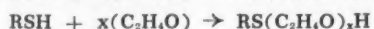
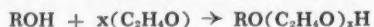
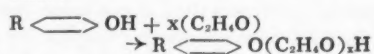
No newcomer to the field, CARBIDE's ethylene oxide has been the starting point for various nonionic surfactants for more than 20 years. Powdered or liquid detergents, for light or heavy duty, can be produced from ethylene oxide derivatives. Such compounds have excellent wetting properties, ability to disperse grease, and a tendency to stabilize foaming. Nonionics derived from ethylene oxide with other reactants are stable in acid or alkaline aqueous systems and are compatible with both anionic and cationic surfactants.

Two types of surfactants can be

produced by reactions involving ethylene oxide. Surface active esters result from reacting ethylene oxide with tall oil or rosin acids, or other hydrophobic acids:—



Ether surfactants are made by the reaction of ethylene oxide with alkylphenols, higher aliphatic alcohols, mercaptans, or propylene oxide polymers:—



Applications for detergents produced from ethylene oxide are found in domestic washing machines and dishwashers, utensil cleansers, and scouring compounds. Commercial establishments use them for large volume laundering, dry cleaning, rug and upholstery cleaning, restaurant dishwashing, and for scrubbing large surfaces.

Information on (1) handling and operating methods when using ethylene oxide, (2) data on TERGITOL nonionic surfactants for detergents, and (3) a 64-page booklet on ethers and oxides is available. Check the coupon.

How quality is maintained at CARBIDE

Close supervision during every step of processing assures CARBIDE's customers of highest quality chemicals—from the point where natural gas enters its plants to the shipping platforms.

At the gas pumping stations, a continuous check is maintained to make certain that CARBIDE's raw material streams meet strict standards. As they are separated, components are analyzed by mass spectrometer. While being processed, material samples undergo careful chemical analysis. Certain materials in process are further

examined with a vapor fractometer, or other appropriate equipment.

Finished materials are subjected to strenuous performance tests, for each of CARBIDE's products must fulfill the expected requirements of customers. Even during loading operations, the final product is rechecked for purity—with an emission spectograph, for example—to make sure it contains no metallic impurities.

And all the while, CARBIDE's Quality Control Laboratories study better testing methods and more advanced scientific devices to assure customers of consistently highest quality.

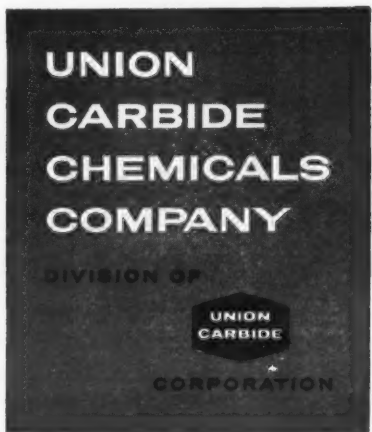
Tear out this coupon. Check the boxes on which you'd like more information, and mail to Dept. H, Union Carbide Chemicals Company, 30 East 42nd Street, New York 17, N. Y.

☐ Chemicals for Resin Emulsions. ☐ Ethylene Oxide—handling and operating methods. ☐ TERGITOL. ☐ Ethers and Oxides.

Name _____
Company _____
Street _____
City _____ Zone _____
State _____

And remember, there is a CARBIDE sales office near you where you can obtain the services of a CARBIDE Technical Representative. His wide industry experience is backed by both extensive chemical training and by Technical Specialists.

"Cellosize", "Tergitol", and "Union Carbide" are registered trade-marks of Union Carbide Corporation.



CHEMICAL MATERIALS

Aminoethylethanolamine expands amine line

Aminoethylethanolamine has recently been added to a commercial line of amine products. It is used as intermediate in detergents, wetting agents, emulsifying agents, and similar products. Product also has application in preparation of high-pressure lubricating oils, greases, and cutting and drawing compounds.

This amine is slightly viscous water-soluble liquid, having strong ammoniacal odor. It is prepared by reaction of ethylene oxide with ethylenediamine. It can undergo reactions of primary and secondary amines and primary alcohols.

(Aminoethylethanolamine is product of Technical Service and Development, The Dow Chemical Company, Midland, Michigan.)

Check 2156 opposite last page.

Starch-dextrin conversion is highly controlled

Recently developed dextrinization process will produce cleaner more uniform dextrins. Process submits dry powdered starch to air flow to permit even distribution of heat and acid to each particle of starch for conversion to dextrin.

Dextrins produced in this manner tend to be lighter in color and cleaner because process is free of localized acidity concentrations. Principal applications are expected to be in paper industry for coating, in bag pastes and prepared adhesives, and in textile industry for print thickener.

(Dextrin is product of Corn Division, A. E. Staley Manufacturing Company, Decatur 60, Illinois.)

Check 2157 opposite last page.

Acrylic monomers, methacrylic acid and acrylic acid, are reported in Methacrylic Acid Literature and Acrylic Acid Literature — Rohm & Haas Company, Washington Square, Philadelphia 5, Pa.

Check 2158 opposite last page.

Check 2155 opposite last page

Three to six containers per freight car were broken in shipments of prilled ammonium nitrate fertilizer. This resulted in substantial product loss as well as lost time for customers in clean-up operations. But . . .

Switch to Extensible Paper Bags Slashed Breakage up to 85%

Problem: Breakage of bags used by Cooperative Farm Chemicals Association, Lawrence, Kan., for annual shipments of 84,000 tons of prilled ammonium nitrate fertilizer amounted to three to six bags per freight car.

This resulted in substantial product loss. Further, broken bags of fertilizer meant the car had to be carefully and thoroughly cleaned. This cost customers time and money after unloading.

Fertilizer is produced year around because demand exceeds supply during heavy season. Excess production was bagged and palletized in warehouse ready for shipping. Bags frequently slipped off pallets, resulting in extra work and lost time.

The co-op last year used 40 freight car loads of 4-ply multiwall bags which had a polyethylene liner.

Solution: Extensive tests were conducted by co-op. A

180-lb, 4-ply bag made with extensible paper—20 lb lighter in paper basis weight—was selected as the one best suited to the company's needs. It has a polyethylene liner.

During tests, a duckpin ball was dropped from a height of 12 to 13" onto a sheet of extensible paper stretched across a frame. The paper did not break until the 13th drop. Regular kraft paper broke on the fourth or fifth drop.

In a test with a filled bag, which normally is handled up to 12 different times, an extensible paper bag containing 80-lb of fertilizer was dropped flat on a cement floor. It did not break until the 34th drop—and then at the sewing end. The body of the bag remained intact. The regular kraft bag broke across the face on the 13th drop.

Results: In the first shipment of 14 cars of fertilizer, only nine extensible paper bags were broken. Six were

damaged by nails. The rest broke on the sewing end, indicating a possible sew-off or some such bagging mishap.

Because extensible bags are flexible, they "hug" pallets and adjacent bags, thus eliminating slipping. The co-op has more than 11,000 pallets which hold 15,000 tons of filled bags. When storage exceeds that tonnage, bags are stacked without pallets, ricking them four or five times.

In the bagging operation, the operators report flexibility and comparative softness of the paper make bags easier to handle. They fold easily at the top for stitching and taping equipment. Operators also say bags are easier to close since prills pack down better with elasticity of the bag.

The co-op has used 400,000 extensible paper bags since they were introduced, and have ordered another 225,000.

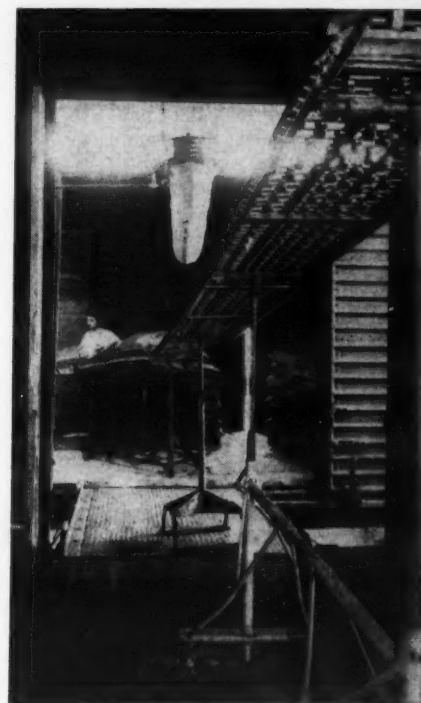
(Wonderwall bags are manufactured by the Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Ave., New York 17, New York.)

Check 2159 opposite last page.

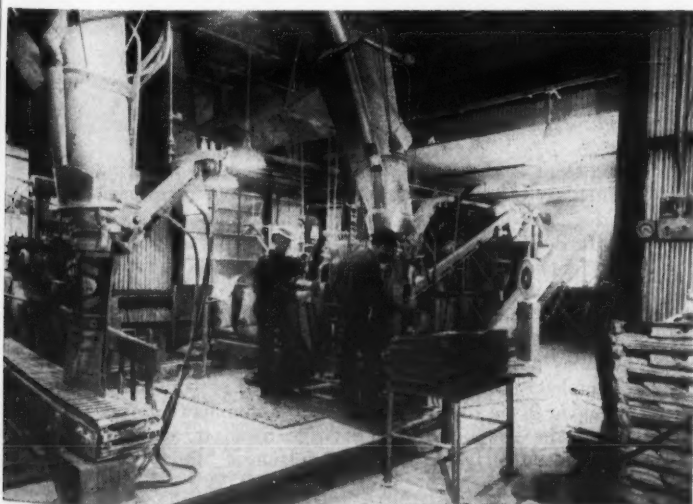
General view of bagging and stitching operation at Cooperative Farm Chemicals Association, Lawrence, Kan., as workers prepare prilled ammonium nitrate fertilizer for shipment in 180-lb, 4-ply bags made with extensible paper. Bagging spout automatically measures 80 lb of fertilizer for each bag; short conveyor moves bag to stitching machine, where operator breaks and forms the top for stitching and taping with pressure-sensitive tape. At peak production, 10 to 12 bags go through this process per minute



Close-up view of the bagging and stitching operation, with operator at stitching machine



After bags are closed, they are conveyed to a loading platform, then are moved via skate conveyor to freight cars for shipping or for transporting to warehouse. A freight car holds some 750 bags. Fertilizer is shipped to nine midwestern states



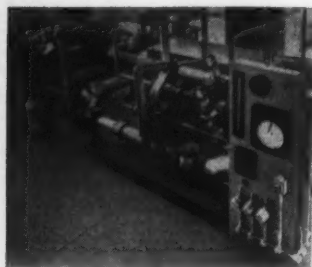
NEW SOLUTIONS

Kettle heated and cooled by package system with close control

Explosion-resistant system
heats unit to 550°F

Heating and cooling a kettle for service requiring close temperature control up to 550°F at Hoffman-La Roche, Inc. was complicated by explosion-resistance requirement. This precluded use of gas- or oil-fired burner.

Packaged multi-pass hot-oil heat-transfer unit was installed. Electric, rather than



Packaged multi-pass hot-oil heat-transfer unit is designed to heat 200 gal of transfer oil from 70 to 518°F in one hour

steam, heater was chosen because pressure of 700 psi would have been necessary with steam-type heater in order to maintain necessary temperature. Electric unit operates at 50 psi max.

Heat-transfer oil designed for 600°F-max use is pumped via closed circuit from unit to processing kettle. For cooling, transfer oil is diverted by valves through heat exchanger.

Complete unit occupies space of 7' x 5'10" x 5'5". Heater is designed to heat the 200 gal of transfer oil from 70 to 518°F in one hour. Motor, controllers, and heater are explosion resistant.

Heater consists of 16 multi-pass steel tubes having capacity of 6.25 kw each. Every element is unit assembly that combines resistor, insulated supports and terminals for connecting resistor to electric-power source.

Elements are wired in increments of 25 kw each for close temperature control and economical power consumption. Complete assembly is

EXCLUSIVE SAVINGS

PRE-TESTED!



Future savings in vacuum tumble drying can be previewed at P-K's Vacuum Tumble Dryer Pre-Test Laboratory. Pre-testing realistically points the way to economies in drying time, solvent recovery, process simplification and handling costs. It helps gain management and purchase approval. And it permits modification of controls, condenser, vapor line, receiver and other components to the individual needs of your process and product.

EXCLUSIVE COMBINATION!

Only P-K Vacuum Tumble Dryers offer pre-tested, pre-packaged savings. In pre-testing, results are predicted with a detailed procedure report and test samples. In pre-packaging, a single source of responsibility delivers a tailored, thoroughly proved assembly at a cost far less than a do-it-yourself project.

Compared to tray drying, the advantages of P-K Vacuum Tumble Dryers are overwhelming. Drying is many times faster. Expensive solvents are condensed and recovered. And caking that requires separate pulverizing and screen-

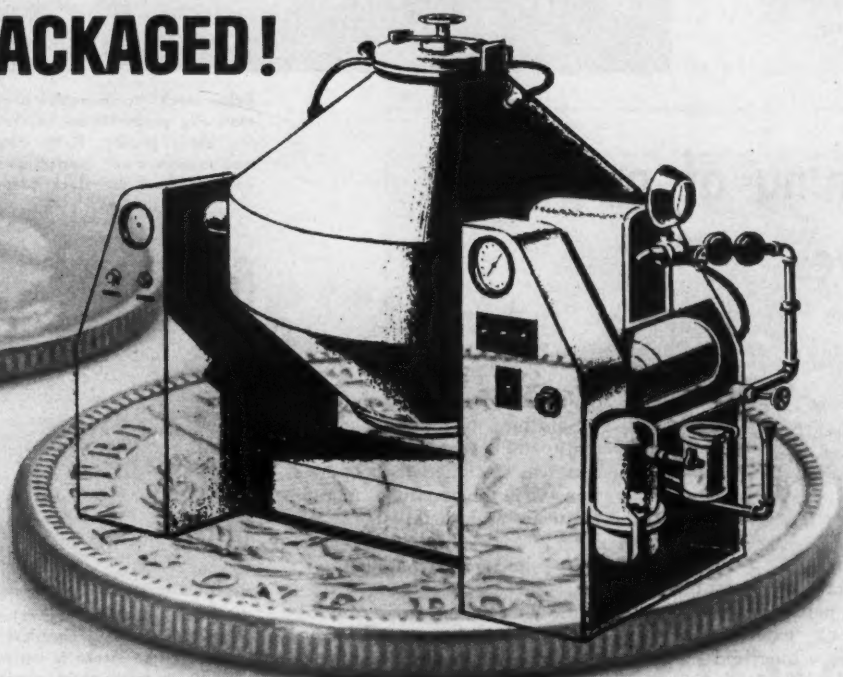
ing steps is eliminated. This greatly reduces handling. It often saves enough in labor costs to justify investment. It safeguards against product contamination.

In design, too, P-K Vacuum Tumble Dryers offer important features. Typical examples: A series of filter precautions that protect the vacuum pump from solids; an optional pin-studded intensifier that produces extra fine powder during drying.

Why not investigate P-K Vacuum Tumble Dryers more completely? Our pre-test facilities are at your disposal. Send or bring your test material. For complete information mail the coupon or call George Sweitzer at our East Stroudsburg Headquarters, 1806 Hanson Street. 17B

with *P-K Vacuum Tumble Dryers*

PRE-PACKAGED!



Pre-packaging utilizes P-K's specialized knowledge of companion equipment and parts. Units arrive completely assembled, fully balanced and ready for use. This eliminates costly, do-it-yourself trial and error during assembly and installation. Moreover, it saves engineering time and overhead from design through purchasing and start-up. You can even see the difference! A neat compactness saves space and makes production areas look better.

**PATTERSON KELLEY CO., INC.
EAST STROUDSBURG, PENNSYLVANIA**

Please send technical literature on P-K Pre-packaged Vacuum Tumble Dryers and details of your offer to pre-test our use of them.

Name _____ Title _____

Company _____

Street _____

City _____ State _____

pre-test your savings

Patterson  Kelley

Chemical and Process Equipment Division

removable from pipe enclosure through terminal box without disconnecting fluid lines or conduit.

Oil is passed through heater passages by three-horsepower pump. High constant velocity and low watt density on heater pipe surface eliminates carbonization of oil.

Heater operates on three-phase 60-cy 440v AC. Control panel is designed for remote operation.

(Electric-resistance heating units are product of Hynes Electric Heating Div., Turbine Equipment Company, Mountainside, N.J.)

Check 2161 opposite last page.

Outdoor liquid rheostat controls 600-hp motor driving matrix pump

Outdoor liquid rheostat, recently installed in Florida phosphate-mining area, is providing control for 600-hp wound-rotor motor which drives dredge-type matrix pump. Installation of this type insures smooth stepless control.

Completely enclosed rheostat and auxiliary equipment are mounted on sled-like



Completely enclosed liquid rheostat and auxiliary equipment are mounted on sled-like structure for transportation in field

structure for convenient field transportation. Unit is used in area not readily accessible to cooling water. Accordingly, it incorporates air-cooled heat exchanger.

(Liquid rheostat is product of Allis-Chalmers Manufacturing Company, 1126 S. 70th St., Milwaukee 1, Wis.)

Check 2162 opposite last page.

Check 2160 opposite last page

Modernization of International Paper Co.'s, Corinth, N. Y., mill saw one fourdrinier replace four older machines. To keep this efficient giant in top running form, company designed a reliable system for . . .

Automatic proportioning of pulp stock and chemical additives

THEODORE W. WETT, Associate Editor
with **C. V. SIMMONS**, Plant Engineer
and **ROBERT DODDS**, Instrumentation Supervisor
International Paper Co., Corinth, New York

Problem: Conventional stock preparation systems were evaluated and found wanting when International Paper Co. was designing installation of a new paper machine at the Hudson River mill in Corinth, N. Y. This machine, a Beloit fourdrinier, is designed for a maximum speed of 2300 fpm to produce

300 tons of coated publication-grade paper per day.

Pulp stock consists of groundwood, bleached and unbleached sulfite, kraft, and broke from paper machine. To this stock are added clay, sizing resin, alum, coagulant, and dyes for coloring.

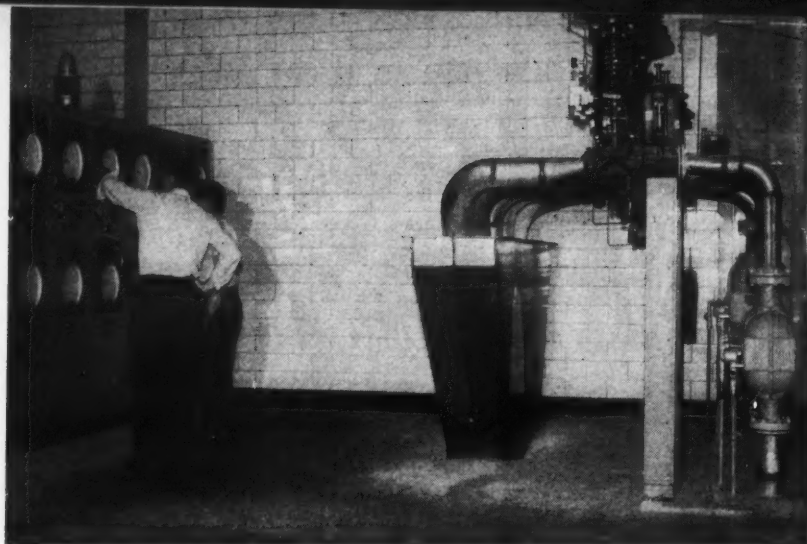
All flows must be proportioned properly to assure pa-

per quality and uniformity.

Solution: Completely automatic stock proportioning system was designed in cooperation with instrument manufacturer, and installed.

Pulp Stock Preparation

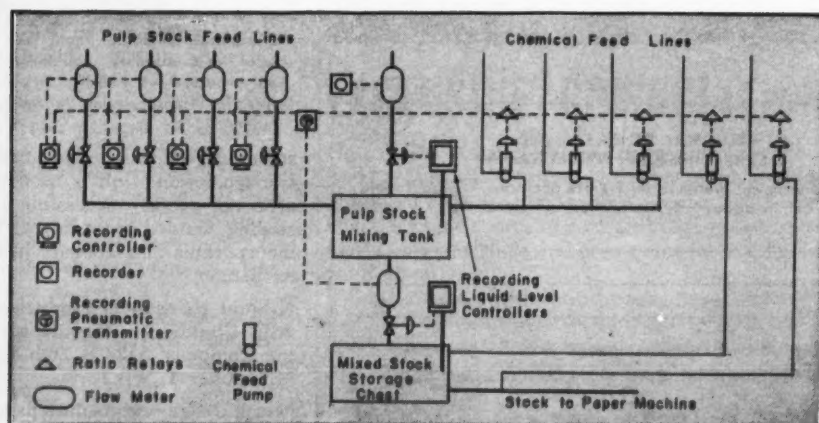
Flow between stock mixing chest and mixed stock storage chest, which feeds machine, is measured by magnetic flow meter. Since level in mixed stock chest is maintained constant, flow to this chest is same as total flow to paper machine. Signal generated by flow meter is fed to a pneu-



Pulp stock components are automatically proportioned to stock mixing chest (right). Ratio controllers and recorders are located on central control panel for stock preparation system (left)



Chemical addition system utilizes controlled-volume chemical feed pumps. Piston stroke is varied pneumatically to maintain proper rate



Simplified schematic of control system for stock preparation and chemical addition for a Beloit fourdrinier at International Paper Co.'s Hudson River mill, Corinth, N. Y.

matic transmitter which generates output air pressure in proportion to total pulp flow.

Transmitter's signal is fed to four ratio controllers for kraft, broke, and bleached and unbleached sulfite. Controllers transmit proportional signal to pneumatically operated flow-control valves which adjust pulp flow to stock mixing chest to maintain proper proportions of each component. Flow of each pulp is measured, recorded, and controlled by separate magnetic flow meter.

Flow of fifth component, groundwood, is determined by liquid level in stock mixing chest. Since flow of other four components of stock to mixing chest is regulated by total

flow to machine, if sufficient groundwood pulp is added to maintain a constant level in mixing chest its proportion in mixed pulp will remain constant. This flow is also measured by magnetic flow meter and recorded.

A Bourdon restrictor in total flow measurement, and fast acting flow-control valve on groundwood line, prevent cycling by delaying slightly changes in flow of other four components.

Provisions are made for automatic shutdown of all pulp flow should the paper machine stop. Entire proportioning system can be shut down manually when desired.

Chemical Addition

Signal from total flow transmitter is also fed to ratio relays for chemical addition system. Pneumatic signal from these is transmitted to appropriate positioner-actuated air cylinder coupled to stroke adjustment of controlled-volume chemical pump. Pump's output varies in direct proportion to air pressure change.

Portion of pneumatic transmitter's signal which is passed on to air cylinder positioners is manually set on ratio relay. Setting is determined by furnish formula.

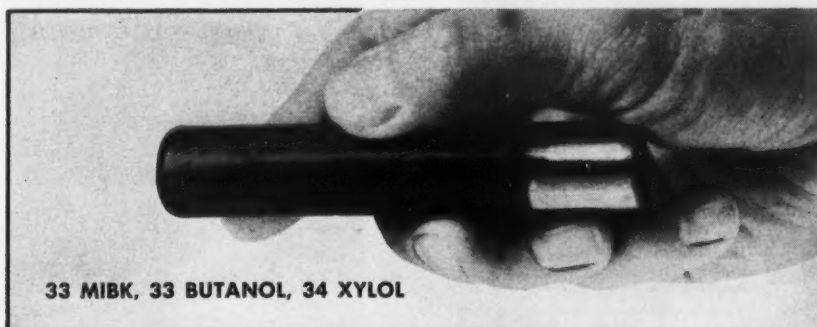
In normal operation, flows in pulp lines range from 200 to 600 gpm depending on component. Flow rates on chemical feed pumps range from 22.6 gpm for clay down to 15.2 gph for dyes. These flows can be varied from 0 to 100% of rated flow capacity of pumps.

Instruments

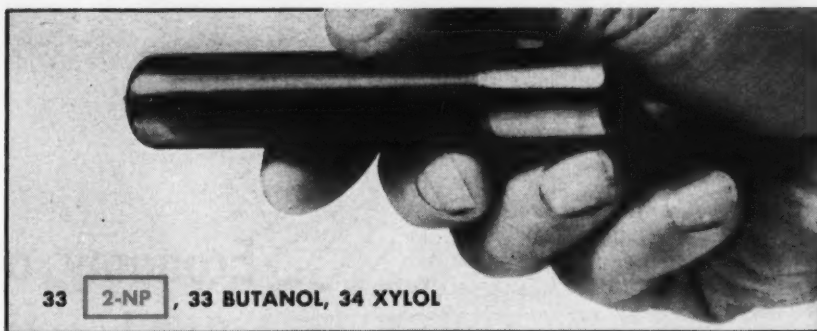
Magnetic flow meter operates on same principle as a power generator. A uniform magnetic field is maintained through a standard pipe section by two energized saddle-shaped coils. Liquid in pipe, passing through magnetic field, acts as a moving conductor and generates an electric voltage which varies linearly with average velocity of liquid.

To page 64

For Extra Protection in Epoxy Coatings



33 MIBK, 33 BUTANOL, 34 XYLOL



33 **2-NP**, 33 BUTANOL, 34 XYLOL

2-Nitropropane makes the difference

With 2-NP, you get

- Greater Chemical Resistance
- Uniform Evaporation Rate
- Minimum Pinholing and Cratering
- Thicker Films

Greater Chemical Resistance. In the test illustrated here, 3/4-inch steel bars were given a resin coating 6 to 8 mils thick. They were dried one week, and then exposed to 30% Nitric Acid. The unretouched photographs are striking evidence of the improvement contributed by 2-NP.

Uniform Evaporation Rate. The evaporation rate of 2-Nitropropane is ideal for spray systems, contributing favorable flow properties and excellent blush resistance with improved drying times.

Other Advantages. Films using 2-Nitropropane show marked reduction of water vapor permeability, excellent spray characteristics, and less tendency to crawl. Also, substantially thicker films can be obtained at no loss of other desirable features. 2-NP can be used to advantage in both polyamide or amine catalyzed systems, and systems employing urea-formaldehyde or phenolic cross-linking agents.

Write for Technical Data Sheet No. 23C.

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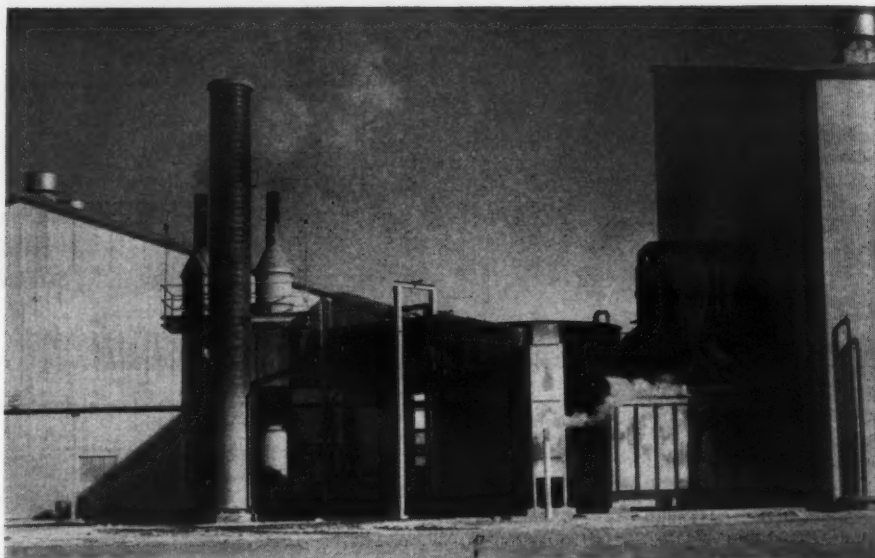
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Check 2164 opposite last page

NEW SOLUTIONS of processing problems



Economy of time and money provided by packaged boilers

Two units used in uranium plant furnish steam requirements for plant as well as CO₂ for recarbonating barren solution

GORDON WEYERMULLER, Associate Editor
 with **E. S. ALLEN**, Mill Manager
 Homestake-Sapin Partners, Grants, N. M.
 and **E. A. MALMBERG**
 Design Engineer
 Utah Construction Company, Palo Alto, Calif.

Principal reason packaged steam boilers were chosen for Homestake-Sapin Partners uranium concentrating plant was in the interest of economy of time and money. Boilers have given good service since plant was completed in July 1958 by Utah Construction Company.

Process steam requirements for the plant and CO₂ for recarbonating the barren solution are furnished by the two packaged boilers. Utilization of CO₂ content of boiler flue gases as reagent make-up in no way impairs operating efficiency of boilers.

Each of boilers is capable of deliver-

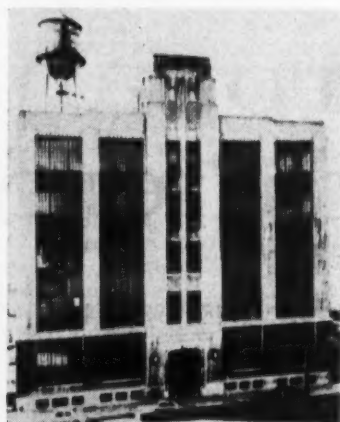
ing 33,000 lb/hr of saturated steam at 150 psig. Boilers are normally operated on natural gas, but may be operated on fuel oil. They are equipped with Coen burners automatically controlled except for changeover of fuels, which is done manually.

Economizers were installed on boilers to control temperature of flue gas for use in the barren solution recarbonation. Reduction of exit gases from 500 to 320°F also makes more use of available heat. Flue gas requirements for recarbonation are taken from boiler stack by an induced draft fan and passed countercurrently to barren solution in two parallel ceramic saddle-packed towers.

Process

Process employed in plant uses a 50 g/l sodium carbonate solution to dissolve the UO₂ and UO₃ from uranium ore.

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OR
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360 EAST SECOND STREET
LOS ANGELES

Here it is, a plant designed for you! **1.00 LABOR** and City of Los Angeles Approved for Chemical Manufacturing, a class AA steel frame and concrete five-story and basement, with \$100,000 worth of equipment. 100,000 sq. ft. plus parking area and S.P. spur track . . . 250 lb. floor load, 14 ft. ceilings, sprinklered . . . four elevators and eight loading doors. Equipment includes tanks, pumps, meters, lines, narcotics and flammable lockers.

PHONE OR WRITE

E. O. SLAVIK

4124 Woodleigh Lane, Pasadena, California: 5Tiven Q-3559

Check 2165 opposite last page

News about

B.F. Goodrich Chemical raw materials

One of packaged boilers is at right. Deaerator is above and economizer just to left of boiler adjacent to small steam vent pipe. At the left are the two recarbonation towers and the stack with attendant liquid piping and pump

Product formed in solution is $UO_2(CO_3)_3$.

Reactions by which $UO_2(CO_3)_3$ is formed are reversible in the presence of free OH ions. To remove free OH ions and prevent this reversal, sodium solution used for dissolving also contains a 15 g/l excess of sodium bicarbonate.

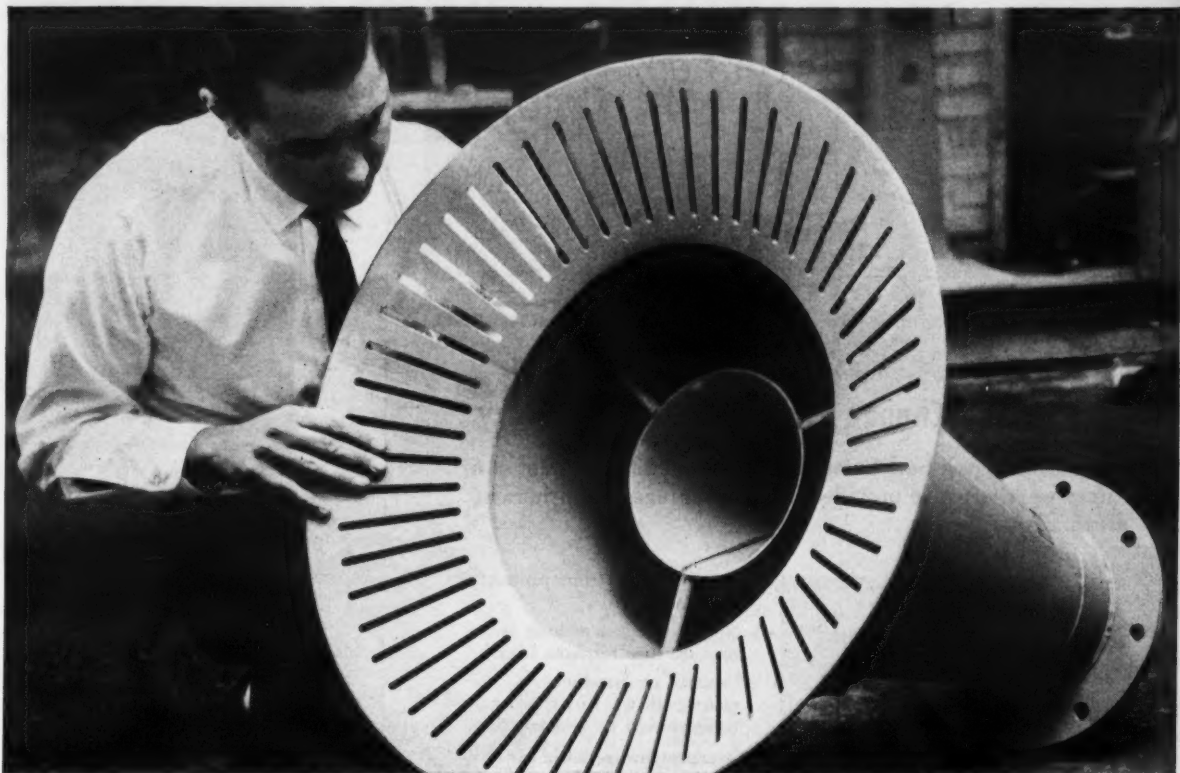
Mill grinds uranium ore in ball mills to about 55% minus 200 mesh in the sodium carbonate/sodium bicarbonate solution. Slurry solution is classified, thickened to about 50% solids, and pumped into vertical autoclaves. Pulp is heated to about 225°F in presence of compressed air at rate of about 500 cu ft/ton of solids. Autoclaves are operated at 65 psig on the domes.

Autoclave discharge is thickened to about 60% solids and filtered in three stages through continuous drum vacuum filter. Precipitation of uranium values from solution is made with caustic soda to provide an excess of NaOH of about 8-10 g/l. Sodium diuranate precipitate formed, $Na_2U_2O_7$, is known as "yellow cake."

Solution resulting is not a true barren solution but contains about 0.10 g/l of U_3O_8 . This solution is recarbonated with boiler flue gases to neutralize the NaOH and to build an excess of $NaHCO_3$ of about 7 g/l. Recarbonated barren solution is recycled to process through pulp filter wash solutions. Yellow cake is filtered, washed, dried, packaged, and sold to the U. S. Atomic Energy Commission under a contract.

(Packaged boilers are product of Power Div., Bros Incorporated, Minneapolis 14, Minnesota.)

Check 2166 opposite last page.



Fume diffusers are fabricated by Electro-Chemical Products Company, Cleveland, Ohio, of sheets of rigid Geon made by Seiberling Rubber Company, Newcomerstown, Ohio. B.F. Goodrich Chemical Company supplies the Geon polyvinyl material only.

FUME DIFFUSERS TOOK A LICKING FROM CORROSION

... till the cones were made from GEON

THESE cones of Geon rigid vinyl show how you can solve corrosion problems. They are used to diffuse hydrofluoric and chromic acid fumes in a chemical plant, where cones of metal and other plastic were tried first.

Geon rigid vinyl solves corrosion problems—because it withstands acids, oils and many hydrocarbon chemicals. Geon also provides for accuracy in fabrication. For example, the sheet of rigid Geon from which these cones were made was machined to extremely close tolerance—.003 inches for the slots—to give the cones the exact design for most efficient

fume dispersion.

Products of versatile Geon polyvinyl materials can be made in rigid form, rotationally cast, slush molded, calendered, extruded or blown into foam form. Applications range from solving all types of corrosion problems from piping to ductwork, to coatings for paper, metal and other materials.

For information on Geon polyvinyl raw materials, write Dept. AL-4, B.F. Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.



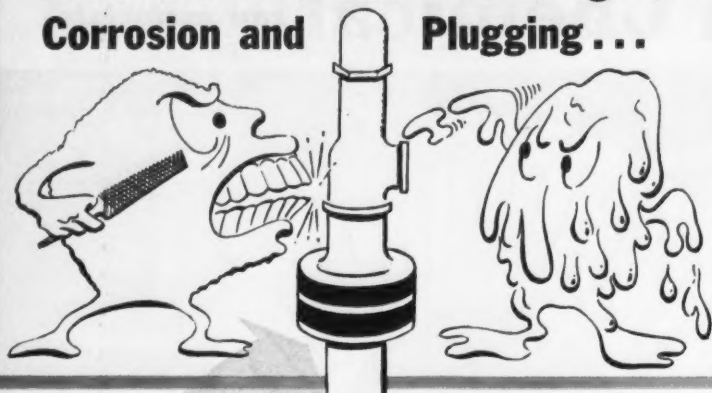
B.F. Goodrich Chemical Company
a division of The B.F. Goodrich Company



GEON polyvinyl materials • HYCAR rubber and latex
GOOD-RITE chemicals and plasticizers • HARMON colors

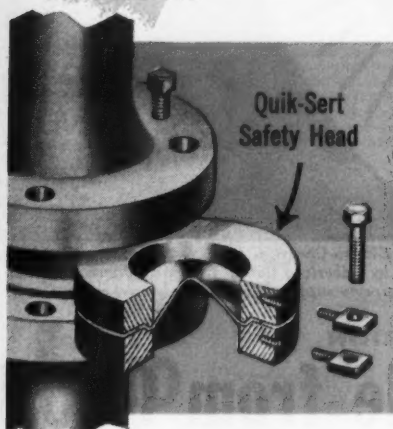
Check 2167 opposite last page

How To Protect Relief Valves Against Corrosion and Plugging ...



BS&B *Safety Head* Is A Damage Barrier That Doesn't Change Valve Operating Accuracy

A BS&B Quik-Sert Safety Head mounted to the inlet of a safety or relief valve provides these advantages not otherwise attainable ...



- Isolates valve from product contamination.
- No product loss as long as the rupture disc remains intact.
- Process or product may be changed without varying valve design or construction.
- Overpressure relief is instant, reaching the valve through wide open, unrestricted orifice.
- Eliminates shut-down time during normal operation.
- Bottle-tight seal during normal operation assures no loss of product.

The absence of a BS&B Safety Head may mean a change of valve construction when process or product is modified. However, with valve mounted above a BS&B Quik-Sert Safety Head the same valve may be used for varying services without alteration. You save the cost of additional equipment. You save the cost of time-consuming valve changes.

If you have a corrosion and plugging problem with your relief valves, call your nearest BS&B Safety Head sales center now. Or write to ...

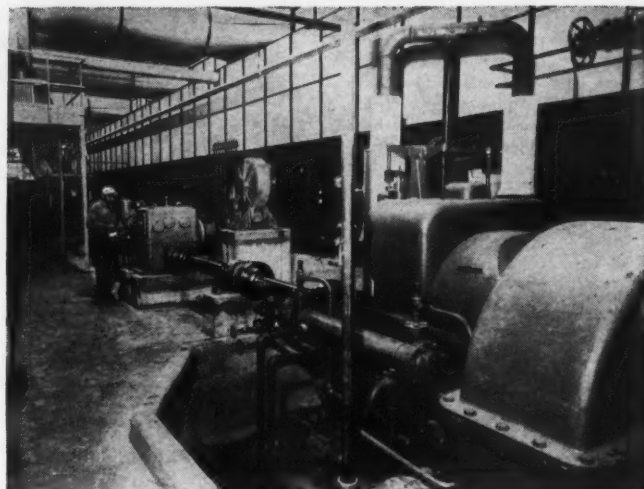
BLACK, SIVALLS & BRYSON, INC.

Safety Head Division
Dept. 2-M6
7500 East 12th Street
Kansas City, Missouri



Check 2168 opposite last page

NEW SOLUTIONS of processing problems



Using a three-speed ratio transmission governor, steam turbine used to drive 240" fourdrinier paper machine, operating at up to 1800 fpm —

**controls speed within $\pm 1/10$ of 1%
over speed range of 10:1**

GORDON WEYERMULLER, Associate Editor
with **GILBERT N. MINOR**, Supervisory Engineer
Whippany Paper Board Company, Inc., Whippany, N. J.

Problem: In order to meet exacting requirements of new fourdrinier paper machine to be installed at Whippany Paper Board Company, control of speed range to $\pm 1/10$ of 1% over entire speed range was required.

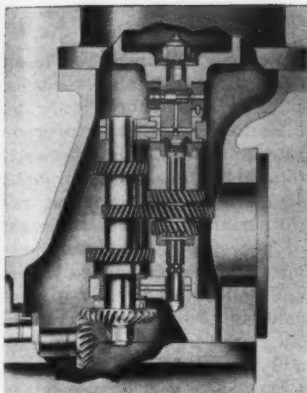
It has been the practice for the paper industry to operate within such close control of speed over a small speed range. However, the fourdrinier machine was scheduled to operate at speeds up to 1800 rpm and might be operated at speeds as low as 180 rpm — depending upon the type of paper being processed. Hence, turbine needed something more than the conventional governor to meet this rigorous requirement, particularly at the lower speeds.

Solution: Engineering stud-

ies showed that the desired improved low speed control could be obtained by having the governor operate at a higher relative speed. This was accomplished by means of a three-speed ratio transmission governor drive.

Consideration was given to advisability of applying an automatic gear shift. However, it was concluded that the simplicity, ruggedness, and reliability of a manual shift was more important. Shift has no "dragging" parts that might wear due to sliding surfaces during normal operation. Neither are there any "loose" parts that could be lost.

Turbine used is a multi-stage, multi-valve unit rated at 2500 hp. It has a single reduction gear having an output



Three-speed ratio transmission governor drive used on paper machine

speed of 1000 rpm. Turbine uses steam at 700°F and 550 psig, which is exhausted at 50 psig.

Rotating element of turbine is designed so that the first critical speed is always above the maximum operating speed. This "stiff shaft" design is of the utmost importance in this application.

Results: Turbine has been found to provide the required speed control within $\pm 1/10$ of 1% over the speed range of 10:1. It has operated satisfactorily with a minimum of maintenance during the more than a year the huge Twentieth Century fourdrinier machine has been in operation. This has helped mill to produce a variety of high-quality papers on the machine. A similar turbine is used on another paper machine at Whippany.

(Multi-stage turbine is product of Westinghouse Electric Corp., 3 Gateway Center, P.O. Box 2278, Pittsburgh, Pa.)

Check 2169 opposite last page.

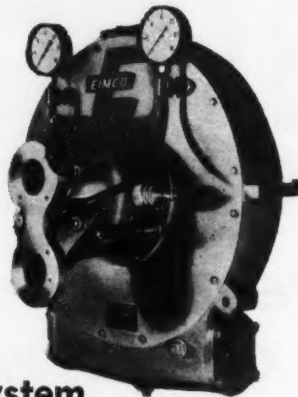
NEXT MONTH

By combining premixing and grinding into one step, a southern paint manufacturer has slashed batch time over 80 percent. Improved product uniformity is a bonus result. Get the full details in this section next month.

These Twin Features Give You Better Drum Filter Performance . . .

1 HY-FLOW Valve

. . . eliminates vacuum loss

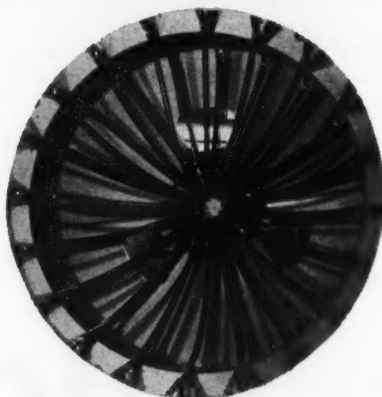


Filtrate flow is always unrestricted with Hy-Flow filter valve, developed by Eimco. This new, streamlined valve entirely eliminates all angular passages which caused troublesome turbulence and vacuum loss on flat type filter valves.

With Hy-Flow valve, drum filters operate more efficiently throughout all zones of the filtration cycle. Operators report greatly improved operating economies.

2 E-VAC System

. . . eliminates moisture in piping



Another major improvement in drum filter design, perfected by Eimco, is the E-Vac system of sweeping moisture from piping with air.

Vacuum to lead and trail pipes from each drum compartment is alternately blocked off as drum revolves. Air drawn through pipes sweeps moisture from piping system and drainage deck. No blow-back of filtrate. Result is a dryer filter cake.

The Eimco representative in your area can give you more facts on Eimco's complete line of filtration or process equipment for liquid-solids separation.

THE EIMCO CORPORATION • SALT LAKE CITY, UTAH

Research and Development Division, Palatine, Illinois

Process Engineers, Inc. Division, San Mateo, California

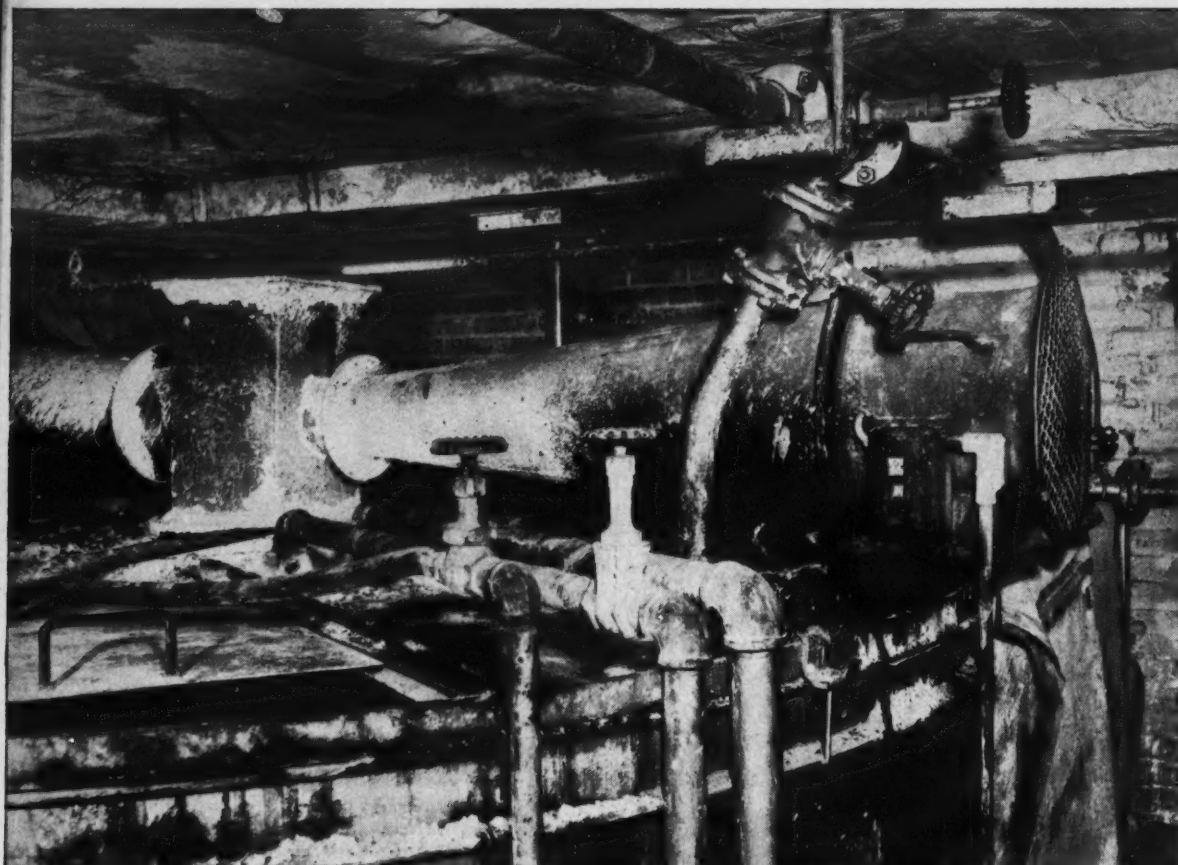
Export Offices Eimco Building, 51-52 South Street, New York 5, N. Y.

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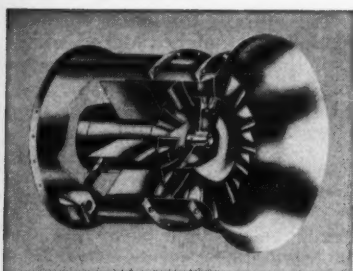


Check 2170 opposite last page



Efficient Joy Axivane Fans vent corrosive fumes from tanks in chemical plant producing fatty acids and polyesters.

CORROSIVE ATMOSPHERE NO PROBLEM FOR THIS JOY AXIVANE® FAN



Other Bulletins also available:
Compressors 268C-80
Dust Collectors 267D-80

Joy Axivane Fans are used to vent extremely corrosive fumes in a number of electroplating and chemical plants across the land. Efficient, quiet, compact and durable Joy Axivane Fans are available in alloy steels or with special coatings to resist the most corrosive atmospheres.

Hundreds of standard models are available with either V-belt or integral drive. They are supplemented by a design service which will give you Joy Axivane Fans with whatever efficiency, capacity or pressure your installation requires.

For details write for Joy Fan Bulletin 268F-80.

Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.
In Canada: Joy Manufacturing Company (Canada) Limited; Galt, Ontario.

WSW 17365-268



AIR MOVING EQUIPMENT FOR ALL INDUSTRY



JOY

Joy Manufacturing Company
Oliver Building, Pittsburgh 22, Pa.

In Canada: Joy Manufacturing Company
(Canada) Limited, Galt, Ontario

NEW SOLUTIONS

Proportioning Pulp

From page 59

Voltage is transmitted to an electronic receiving recorder calibrated to record flow rate.

Ratio controllers incorporate a ratio linkage between total flow measurement input signal and pneumatic set ratio signal, and act to maintain proper output signal to pneumatic positioners on valves. A dial calibrated directly in percent is provided adjacent to each instrument to eliminate all computations. Operator merely sets desired percentage on dial.

Chemical Feed Pumps

Controlled-volume chemical feed pumps are combination piston-diaphragm units. A piston, reciprocating within an accurately sized cylinder at established stroke length, displaces an exact volume of hydraulic medium — a special-property oil.

Oil hydraulically moves a diaphragm alternately forward and backward. Displacement from diaphragm moves chemical through suction check valve on suction stroke of piston and discharges like amount of chemical through discharge check valve on discharge stroke. Diaphragm isolates chemical being pumped within chemically stable reagent head plate and check valve cylinders.

Results: System provides a smooth flow of properly proportioned pulp for efficient paper machine operation, and top quality paper. Maintenance has been negligible. Repeatability, when furnish formulas change, has been completely satisfactory.

(Liquid level controls, flow meters, pneumatic transmitter, ratio controllers, and recorders were supplied by The Foxboro Company, Foxboro, Massachusetts.)

Check 2172 opposite last page.

(Pulsafeeder chemical feed pumps were supplied by Process Equipment Div., Lapp Insulator Co., Inc., Le Roy, New York.)

Check 2173 opposite last page.

Check 2171 opposite last page

GAYLORD IS INSTRUMENTAL IN CONTROLLING PACKAGING COSTS

Gaylord plays a vital role in reducing costs throughout your packaging operation. Talented G-men study your needs with a trained eye, recommend packaging in perfect harmony with your objectives . . . from a full score of services in new packaging developments and engineering techniques.

Call your G-man. He can give you the right key . . . whether you need corrugated boxes by the millions or engineered packaging.



GAYLORD
CONTAINER CORPORATION



HEADQUARTERS, ST. LOUIS
PLANTS COAST TO COAST

DIVISION OF **Crown Zellerbach Corporation**



For
more information
on product at
right, specify 2174
see information
request blank
opposite last page.



IT'S**NEW!****Lapp**

auto-pneumatic "MICROFLO" PULSAFEEDER

precise pumping at micro-flow rates
regulated by pneumatic control instruments

Here's a controlled-volume metering pump that will vary its microflow rate of output automatically to a changing process condition. Auto-Pneumatic Microflo Pulsafeeder is a piston-diaphragm pump with no stuffing box or other seal—it handles fluids without contamination or leakage.

Output of a standard Microflo is governed by controlling the travel of its piston. This is done manually through a micrometer. In the Auto-Pneumatic model, an air cylinder performs this operation. As a change in a process condition occurs, a pneumatic control instrument senses the change, records it and sends an air pressure signal descriptive of the changed condition. Auto-Pneumatic Microflo Pulsafeeder reads this air signal and changes its pumping rate accordingly.

Four models are available with flow rangeability of 10 to 1 and a flow range from 585 ML per hour maximum up to 1.2 gph maximum. Reagent head assembly is made from Carpenter No. 20 Stainless, Diaphragm is Kel-F and valves are Hastelloy C. Other materials are available on special order.

WRITE FOR BULLETIN 500-A containing complete description and specifications on the new Auto-Pneumatic Microflo Pulsafeeder. Lapp Insulator Co., Inc., Process Equipment Division, 3508 Poplar Street, Le Roy, New York.

Lapp

NEW SOLUTIONS

Valve closure problems solved at steel company by Teflon sleeve

Problem: Plug valves "frozen" tightly by constant exposure to 93% sulfuric acid and extremes in weather, caused lost production time and high maintenance costs. Valves were installed on lines supplying makeup acid for continuous pickling tanks at a large midwestern steel company.

When company wanted to periodically drain tanks for maintenance and inspection, valves often could not be closed, particularly in winter months. They had to be broken from lines and replaced, which was both costly and time consuming.

Temperature of acid being carried in lines varied with weather conditions since storage tanks were located outside.

Solution: In 1950, valves with a Teflon sleeve were installed on acid feed lines. Units consist of a corrosion-resistant alloy body and plug, separated by a Teflon sleeve. Tapered plug with adjusting plunger and screw provides positive sealing pressures above those possible in lubricated plug valves. Teflon eliminates metal-to-metal contact and consequent galling and sticking. No lubrication is needed.

Results: Sticking of valves, even after prolonged exposure to acid and extremes of weather, has been eliminated. Maintenance is low. Only one Teflon sleeve has needed replacing since units were installed in 1950. Acid line shut-off can now be accomplished quickly and easily.

(Durco type-F plug valves with Teflon sleeves are a product of The Duriron Co., Inc., Dayton, Ohio.)

Check 2176 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

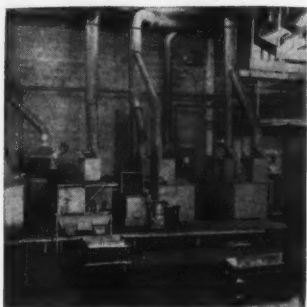
Check 2175 opposite last page

NEW SOLUTIONS

Acids, deionized water handled trouble-free by UPVC pipe

Lightweight pipe is easy to install, maintain

Uplasticized polyvinyl chloride pipe is being utilized to advantage in plating department of National Lock Company's Fastener Division plant in Rockford, Illinois. Normal-impact UPVC was chosen as material for 1 to 4" diameter pipe which carry acid solutions and deionized water.



Unplasticized polyvinyl chloride pipe handles acid solutions and deionized water, guards against corrosion in plating department of fastener plant

External and internal corrosion resistance was a major factor in choice of UPVC. Absence of galvanic or electrolytic action with the pipe is particularly important in handling deionized water since corrosion might occur if a metal blank managed to get into conventional metal pipe. Also, there is no discoloration and contamination of acid and make-up water from metal scale.

In plant, 1 and 2" lines are used to send deionized water to rinse tanks in barrel plater. Lines of 1, 1½, and 2" carry 37% muriatic acid to acid-dip tanks. Larger size, 3 and 4" pipe is utilized throughout plating department to convey spent acid solutions to treatment tanks.

Solutions handled include hydrochloric, nitric, acetic, phosphoric, and other acids of varying concentrations. Operating conditions are 40 psi at 60 to 90°F.

The lightweight pipe was

four compelling reasons to specify

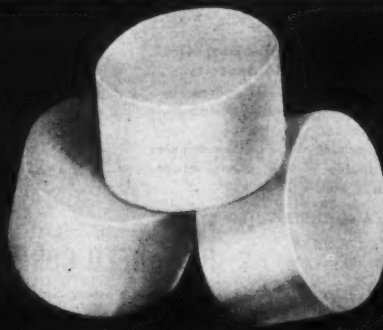
National[®] MALEIC ANHYDRIDE Tablets

FEWER FINES • LESS DUSTING

Up to 75-90% fewer fines by
comparative screen analysis
after 1,000-mile truck haul

OPTIMUM REACTION RATE

Uniform physical properties
for uniform melting and
esterification in your kettle



UNIFORM CHEMICAL ANALYSIS

Made by our exclusive direct
continuous catalytic oxidation
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Crystalline white tablets
give clear molten material
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National Maleic Anhydride Tablets have the ideal shape and composition for easy, economical use. Yet, you pay no price premium for this premium quality you get in National Maleic Anhydride.

In fact, you may be able to reduce in-

ventories and save dollars through mixed car or mixed truckload rates on combination orders for any of the resin chemicals listed here.

Why not get our price and delivery quotation on your next order?

Maleic Anhydride • Fumaric Acid • Phthalic Anhydride • Adipic Acid • Succinic Anhydride
NADONE[®] Cyclohexanone • NAXOL[®] Cyclohexanol • Succinic Acid • Tetrahydrophthalic Anhydride
Hexahydrophthalic Anhydride • Dodecylsuccinic Anhydride • NADIC[®] Anhydride • NADIC[®] Methyl Anhydride

NATIONAL ANILINE DIVISION

40 RECTOR STREET, NEW YORK 6, N. Y.

Atlanta Boston Charlotte Chicago Greensboro Los Angeles
Philadelphia Portland, Ore. Providence San Francisco

In Canada: ALLIED CHEMICAL CANADA, LTD., 100 North Queen St., Toronto 14



Check 2177 opposite last page

NO SURFACE IS STRONG ENOUGH



to resist

ABRASIVE
power of

**BLACK
BEAUTY**

**BLAST
GRIT**

- ★ No silicosis health hazard—safe clean, sure
- ★ Fastest cutting, sharpest material known
- ★ Longer lasting, reuseable many times over

- ★ Moisture-free no packing from dampness. **FREE FLOWING.**
- ★ Leaves surfaces absolutely clean—no deposits
- ★ Gives highest degree of etch for better bonding.

FREE

WORKING

SAMPLE

AT NO COST

WRITE TODAY for new, technical brochure and envelope samples of five grades available for any degree of etch. Choose grade, minimum amounts necessary for trial run.

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Passaic, N. J.

Check 2178 opposite last page

for DROP-TIGHT CLOSURE THIS VALVE **EXCELS!**



Whether the need be for drop-tight or bubble-tight shutoff—with Rockwell rubber-lined butterfly valves you're always sure of positive sealing. Liner may be of natural or synthetic rubber to suit conditions.

- Valve sizes—4" to 72" and larger.
- Pressures—as high as 700 psi.
- Construction—of any required metals.
- Control—manual or automatic.

Write for Bulletin 582

**W. S. ROCKWELL
RUBBER-LINED
BUTTERFLY VALVES.**



W. S. ROCKWELL COMPANY

Valves—Butterfly • Slide • Diaphragm • Special

2209 Elliot Street • Fairfield, Conn.

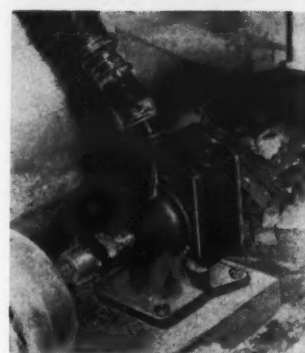
Check 2179 opposite last page

NEW SOLUTIONS

easy to install and requires little, if any, maintenance. Virtually all connections were made by solvent cementing.

(Further information about UPVC pipe and fittings may be obtained from Tube Turns Plastics, Inc., Joint Subsidiary of Chemetron Corporation and Jackson & Church Company, 224 E. Broadway, Louisville 1, Ky.)

Check 2180 opposite last page.



Abrasive earth slurry presents no problem to plastic pump

No seals or stuffing boxes in rotary-squeegee pump

Problem: Conventional metal pumps proved unable to convey abrasive diatomaceous-earth slurry for more than short periods of time without requiring excessive maintenance at H. S. Mensing Co., Finderne, N. J.

Earth is used as additive to keep ready-mix concrete aerated. Accurately measured amounts of 63%-by-weight slurry are pumped from main mix tank on ground to loading towers. This passage includes 100' horizontal run and 30' vertical rise.

High-quantity production demands two- to three-hour-per-day operation, six days per week.

Abrasive mix tended to settle rapidly, causing pumping unit to malfunction. This required frequent dismantling and maintenance. Repair and replacement of impellers or scored pump shaft was excessive, while leakage was constant.

Solution: Plastic rotary-squeegee type pump was installed. Pump has neither seals nor stuffing boxes. This is made possible by flanges on flexible liner.

Flanges straddle pump housing and are pressed to sides by bolted face plates. In this manner isolated fluid chamber is formed between inside of Buna N body block and outside of flexible liner.

Pumping action is accomplished by rotor mounted on

Only maintenance required on pump since December 1955 has been one replacement of flexible liner

eccentric shaft. Rotor whirls within center of liner, creating progressive squeegee-type action on fluid trapped between liner and body block.

Resilient synthetic liner absorbs any abrasive action of material conveyed, permitting easier passage of slurry.

Results: Pump has been operating since December 1955, on six-day schedule, moving 14 gpm of additive slurry. Only maintenance required to date has been replacement of one flexible liner. Leakage and maintenance of shaft seals have been eliminated.

(Plastic sealless pump is product of Vanton Pump & Equipment Corporation, Hillside, New Jersey.)

Check 2181 opposite last page.

WANTED: NOMOGRAPHS — WORTH \$20 EACH

Do you have a pet nomograph that could save time for other **CHEMICAL PROCESSING** readers? If so, send it neatly and accurately drawn, with a double spaced, type-written description to:

Data Editor

CHEMICAL PROCESSING
111 E. Delaware Place
Chicago 11, Illinois

We will pay \$20 for each one accepted and published.

PROCESS PIPING POINTERS

Low alloy plug disc gate valve works as gate or globe

This corrosion-resistant valve serves two purposes with equal efficiency. As a gate on constant-speed pump service, it permits unrestricted straight-line flow. On throttling service, the long-tapered plug disc provides accurate flow regulation. All parts in contact with flow are 18-8 SMO. Nonturning disc eliminates seat galling and wear. Rated 1500 psi—water, oil or gas. Developed for severe pool-repressuring service in oil fields, this valve is ideally suited for any severe chemical processing applications. Available in 1" size only. Full details on request; see below.

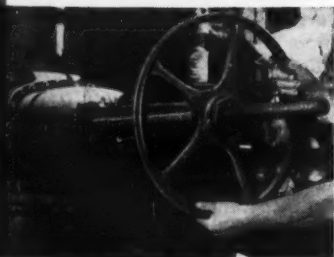


What valves for guided missile and rocket fuel services? This guide tells what's available

This is not a catalog but a basic data guide selection of valves for use by missile fuel manufacturers . . . and valves for handling fuels and other fluids at launching pads, testing stations and operational bases. Includes all specification and ordering data. Registered copies supplied free on qualified inquiries. Ask for "Valves for Guided Missile and Rocket Services." See below.



Frequent operation tests Lightness of this iron gate valve



Installed in 1942 on a 250 F chemical processing unit and operated approximately once a year, this all-iron wedge gate valve shows no leakage and works like new. Not a penny has been spent on the valve for maintenance. Read the facts on this installation in the Crane ad on next page.

For literature or data on products listed above, please contact
E. Bradbury, Manager,
Chemical Sales Dept. No obligation.

CRANE CO.

Head Office: 836 S. Michigan Ave., Chicago 5
VALVES • FITTINGS • PIPE
PLUMBING • HEATING • AIR CONDITIONING
Branches and Wholesalers Everywhere

Check 2182 opposite last page

JUNE 1959



processing and engineering data

259

Heat Transfer Coefficients for Nucleate Boiling

IRVING GRANET

Nuclear Energy Dept.
Foster Wheeler Corporation

Nucleate boiling has become one of the most frequently used methods of heat transfer in the chemical and allied fields. In particular most nuclear reactors depend upon this phenomenon to generate steam.

Glasstone¹ gives a formulation for the heat transfer to water in nucleate boiling as a function of pressure and temperature differential. In reduced form, this equation is:

$$h = c (\Delta t)^{1.42}$$

where

h = coefficient of heat transfer, Btu/(hr) (sq ft) (°F)

c = a constant dependent upon pressure

Δt = temperature difference between surface causing boiling and saturation temperature of fluid being boiled, —°F

Accompanying nomograph is a solution of this equation for various pressures.

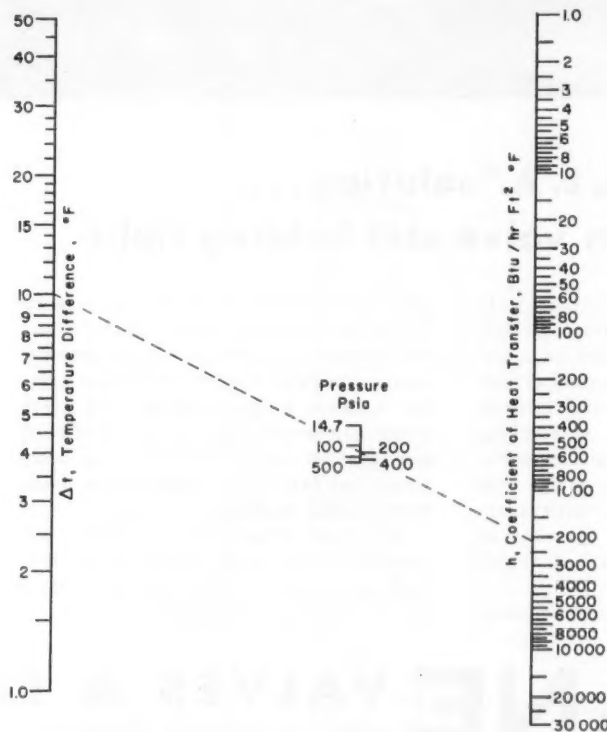
Typical Example

Heat is being transferred to water at 215 psia from a tube. The surface of the tube is 10°F hotter than the saturation temperature of the water. Determine the heat transfer coefficient.

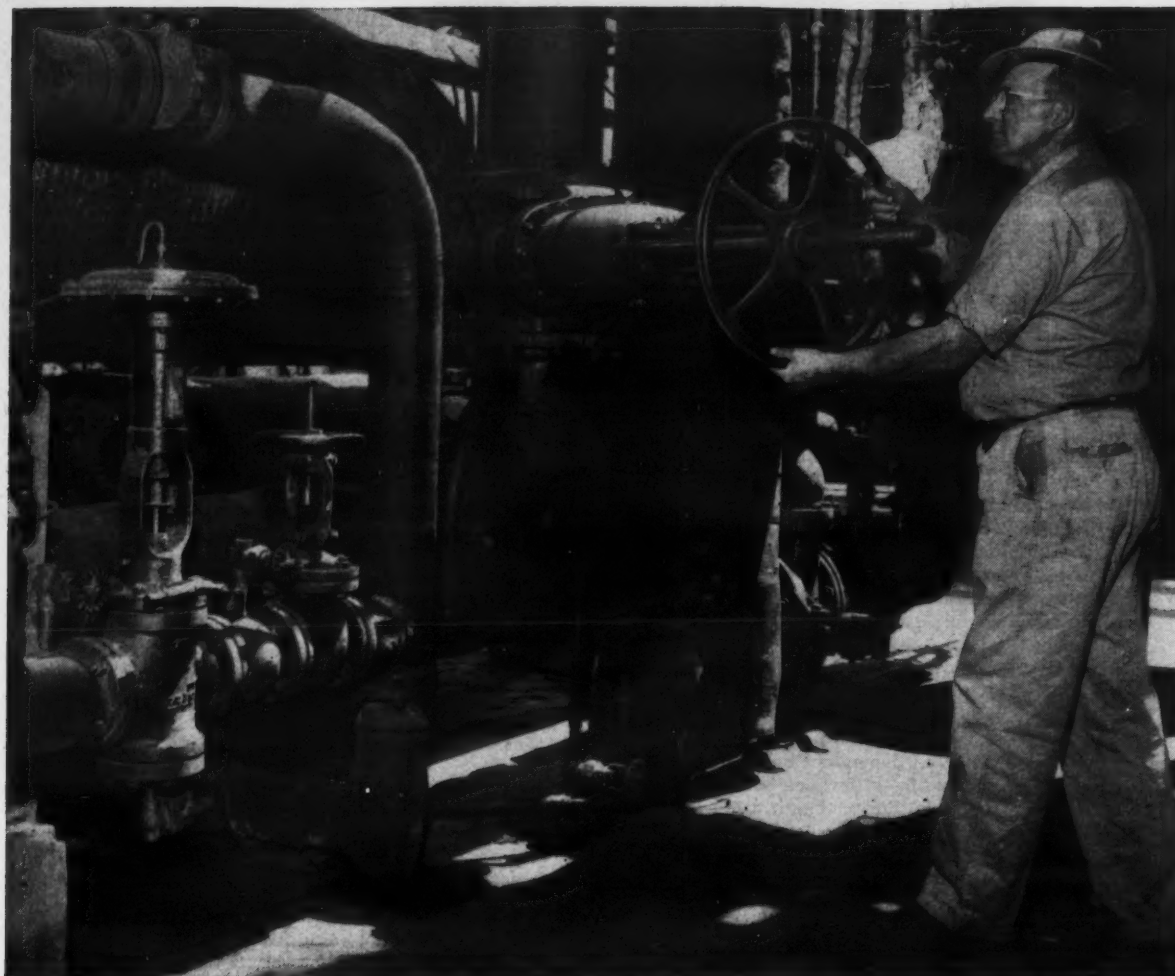
Connect 10 on Δt scale with 215 on pressure scale and read h of 2170 on h scale.

LITERATURE CITED:

- 1) GLASSTONE, S. "Principles of Nuclear Reactor Engineering," 1st ed, pp 694 et sequi, D. Van Nostrand Company, Inc., Princeton, N.J. (1955).



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17 years on M. E. A.* solution ... this Crane iron valve still holding tight

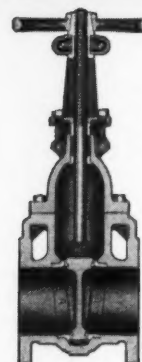
The facts: 17 years on hard-to-hold *Mono-ethanol-amine solution at 250 F with no leakage. No repairs or maintenance to date. Working as good as new.

That's what the Commercial Solvents Corp. petrochemical plant at Sterlington, La., reports on this 12-in. Crane No. 475½, 125-Pound, all-iron wedge gate valve. It is used as a block valve on the M.E.A. process unit, and operated on yearly turn-arounds or if a leak should develop in the unit.

This example is typical of the depend-

able performance of Crane iron body wedge gate valves. Their durable, low-cost service results from Crane features such as an extra number of bonnet bolts for uniform gasket loading and tight joint; full-length disc guides that save seat surface wear; shoulder-type body rings that can't come loose; extra deep, non-binding stuffing box design.

Ask your Crane Representative for more details on these better service iron body gate valves. They can save you a lot of maintenance dollars.



Cross section, 125-pound iron body gate with flanged ends, outside screw and yoke. Available in all-iron or bronze-trimmed. Line includes non-rising stem valves; also screwed and hub ends. Sizes 2 to 48 in. See your Crane catalog.

CRANE VALVES & FITTINGS

PIPE • PLUMBING • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Illinois—Branches and Wholesalers Serving All Areas

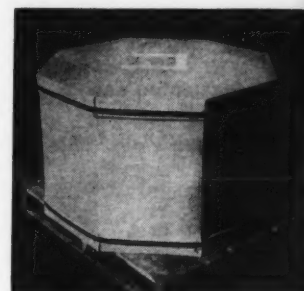
Check 2183 opposite last page

NEW SOLUTIONS

Liquid resin packaged in paperboard drum

Problem: Customers of Pennsylvania Industrial Chemical Corporation had trouble removing solid hydrocarbon resins from the 51-gal, 28-ga steel drums into which they were poured hot, while still liquid, at PICCO's Clairton, Pa., plant.

When drum was cut away from the cooled solid resin,



Corrugated container holds 1400 lb of hydrocarbon resin

much care had to be taken to prevent metal cuttings from getting into the resin. Their presence could spoil the customer's batch or damage his processing equipment.

Solution: PICCO recently started to package the resin in a corrugated container called the Drumpak. This container holds 1400 lb of the hot resin (190°C); steel container held 400 lb. Solid resin is removed by cutting two steel straps top and bottom, and cutting and stripping away the paperboard.

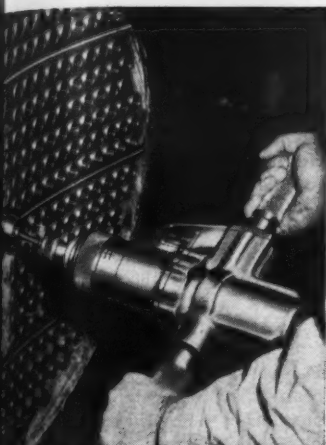
Results: It's easy for customers to remove the resin; the paperboard strips off readily. Possibility of batch contamination or equipment damage is eliminated. Customer handling and storage is simplified since the new container holds over three times as much as the old.

Container cost is less. Freight tare charges are somewhat reduced, too.

(Drumpak is a development of Gaylord Container Corporation, Division of Crown Zellerbach Corporation, 111 N. Fourth St., St. Louis 2, Missouri.)

Check 2184 opposite last page.

AIRETROL



automatic tube expansion control

rolls $\frac{1}{4}$ "- $1\frac{1}{2}$ " O.D. tubes pneumatically faster than you ever thought possible. Average worker easily rolls up to 12 tubes per minute.

Here's why . . .



Operator dials desired torque in ft.-lbs. on micrometer head. Precision torque-sensing mechanism automatically stops expansion at this setting . . . maintains .001" accuracy consistently. Result? More work per man-hour, operator error eliminated. Write for Bulletin No. 64 or plant demonstration.

AIRETOOL

MANUFACTURING COMPANY

SPRINGFIELD, OHIO

BRANCH OFFICES: New York, Chicago, Tulsa, Philadelphia, Houston, Baton Rouge.
REPRESENTATIVES: in principal cities of U.S.A., Canada, Mexico, South America, England, Europe, Puerto Rico, Italy, Japan, Hawaii.
EUROPEAN PLANT: Vlaardingen, The Netherlands.
CANADIAN PLANT: Brantford, Ontario



processing and engineering data

260

Sedimentation Rates

DENNIS E. DRAYER

Dow Chemical Company
Midland, Michigan

Stoke's formula² relating the settling rates of spherical grains is:

$$u = \frac{gD^2(\rho_s - \rho)}{18\eta}$$

where

u = terminal velocity, cm/sec
 g = acceleration due to gravity, 981 cm/sec²
 D = diameter of sphere, cm
 ρ_s = density of sphere, g/cm³
 ρ = density of fluid, g/cm³
 η = coefficient of viscosity of fluid, poise

This nomograph, constructed by methods previously described¹, allows rapid solution of the equation.

Typical Example

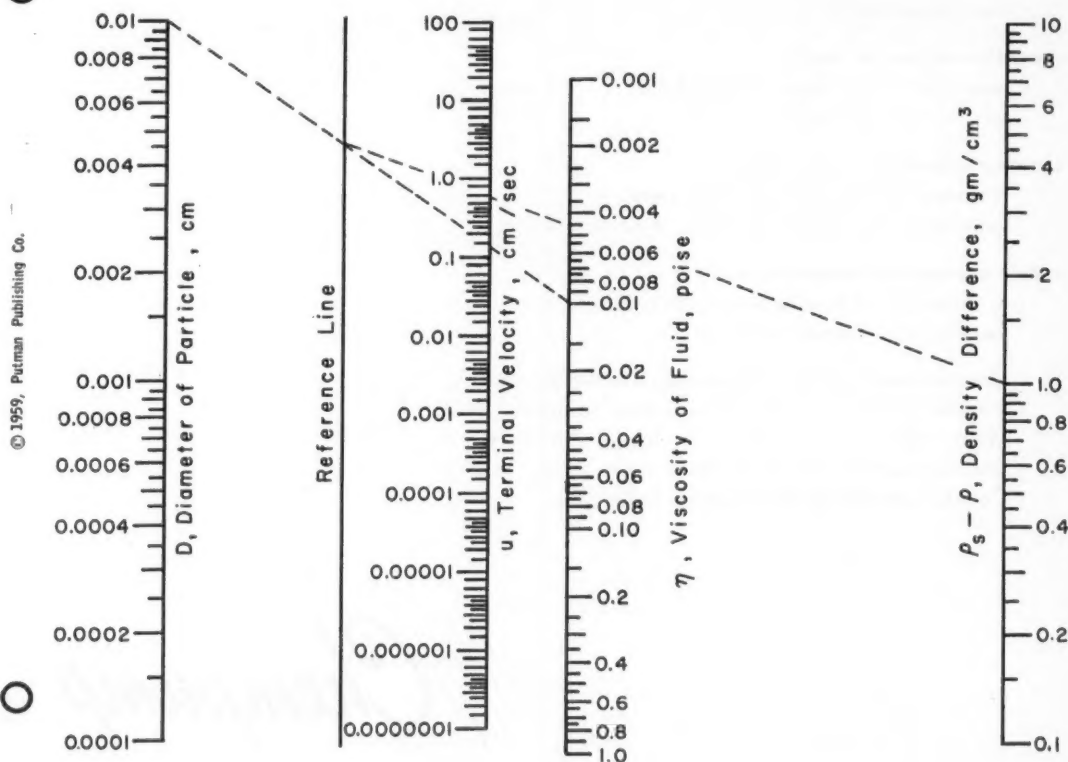
What is the terminal settling velocity for 0.01 cm diameter spheres of density 2.0 g/cm³ in water at 20°C? For water at 20°C, $\rho = 1.0$ and $\eta = 0.01$.

$$\rho_s - \rho = 2.0 - 1.0 = 1.0$$

Connect $D = 0.01$ with $\eta = 0.01$. Then connect the reference line intersection with $\rho_s - \rho = 1.0$ and read $u = 0.55$ cm/sec.

LITERATURE CITED:

- 1) BAKER, W. W. and SIMONS, H. P. "Simplified Procedure for Nomograph Construction", W. Va. University Engineering Experiment Station Bulletin 34, Morgantown, Sept. 1952.
- 2) PERRY, J. H. "Chemical Engineers' Handbook," 3rd ed, p 937, McGraw-Hill Book Co., New York (1950).



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the **BEST PUMP**

for volatile fluids is the Canned Pump

Pump and motor are a single, leakproof unit . . .
with no seals or stuffing boxes. Volatile fluids
stay inside where they belong.

CHEMPUMP

is the Canned Pump

. . . the answer to your difficult pumping problem.
Only Chempump—the original canned pump—offers you
these advantages:

- **experience-proved design . . .**
stemming from 7 years of rugged field
service. *Only Chempump has it!*
- **nation wide field engineering . . .**
personnel with specialized application
knowledge you must have. *Only Chempump has it!*
- **field-proven performance record . . .**
in thousands of installations in all types of
service. *Only Chempump has it!*

Use *the* canned pump—Chempump—to handle your
volatile or toxic or costly, or any other "problem" fluid.
Write today . . . for "request for quote" data sheet . . .
to Chempump Corporation, Buck and
County Line Roads, Huntingdon Valley, Pa.



Chempump

First in the field...process proved

Check 2186 opposite last page

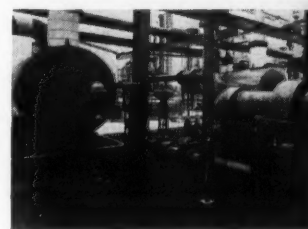
NEW SOLUTIONS

Fire-protection sprinklers are supplemented by floor grating

Corrosion-resistant floor grating has been in use for five years, supplementing a fire-protection system, at Dow Chemical Company's Midland, Michigan, plant. Several hundred thousand sq ft of 1 x 3/16" grating are incorporated in production facilities which are as high as 210' and have as many as 21 levels.

Use of grating permits concentration of sprinkler nozzles in upper plant areas. This increases system effectiveness considerably, since water can pour easily from upper to lower levels.

Use of grating eliminates major cause of outdoor corrosion — gathering of water in puddles on floor. Electro-forged fabrication of grating



Twisted-bar surface of floor grating provides safe footing

precludes joints that would be likely areas for corrosive attack in penetrating chemical atmosphere.

Floors have been easy to maintain. Rain provides a large portion of necessary cleaning action. A wire brush or sand blasting can fill in the remainder.

Twisted-bar surface of grating results in safe, sure footing. Snow and ice can not gather to endanger walking.

(Floor grating is product of Blaw-Knox Company, 300 Sixth Ave., Pittsburgh, Pa.)

Check 2187 opposite last page.

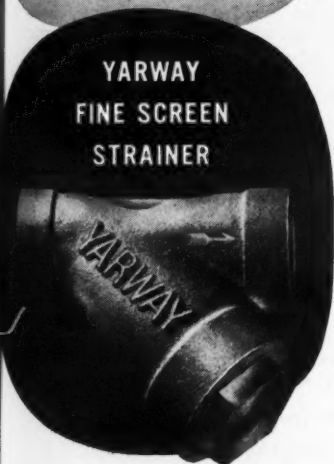
Condenser applications in cooling and refrigeration are depicted in four-page bulletin. Photos and descriptions of actual installations are included in Condenser Application Bul—Frick Company, Waynesboro, Pa.

Check 2188 opposite last page.



YARWAY
IMPULSE STEAM TRAP

a good team
for steam



YARWAY
FINE SCREEN
STRAINER

This Yarway team has scored high—over a million installed on all types of steam equipment. Stocked and sold by 270 Industrial Distributors. For free Steam Trap Book, write YARNALL-WARING CO., 125 Mermaid Ave., Philadelphia 18, Pa.

go **YARWAY**
with confidence

CUT HERE AND FILE

© 1959, Putman Publishing Co.

Flow of Water from Horizontal, Open-end Pipes

CLIFFORD L. DUCKWORTH
East Alton, Ill.

This nomograph presents a means of determining the rate of flow of water from horizontal, open-end pipes. It is based on the equation¹:

$$q = 1.04 A D$$

where

A = internal transverse area of the pipe, sq in

D = horizontal distance from pipe opening to a point where the water stream has fallen one foot, in

q = rate of flow of water, gpm

Typical Example

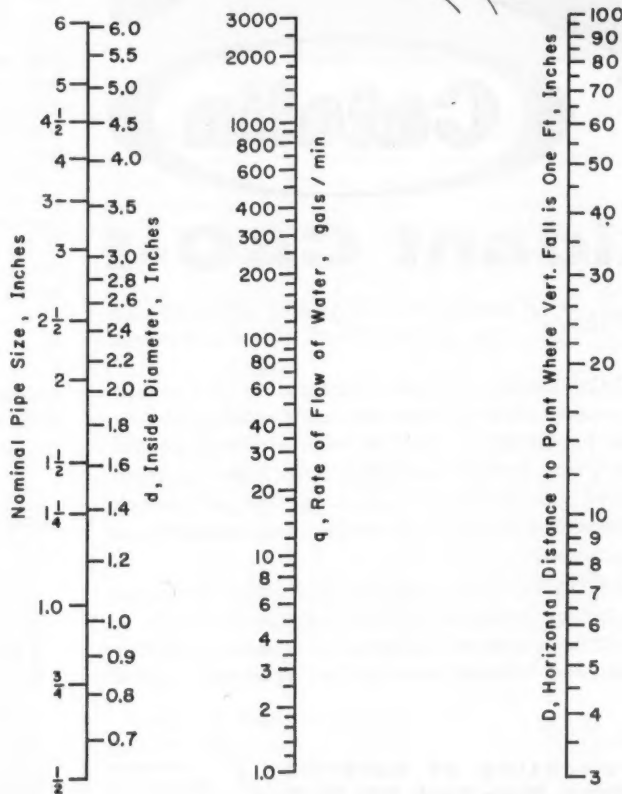
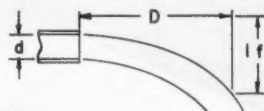
Water is pumped out of a horizontal pipe of 4-inch nominal diameter; the stream drops one foot at a point 75 inches from pipe opening.

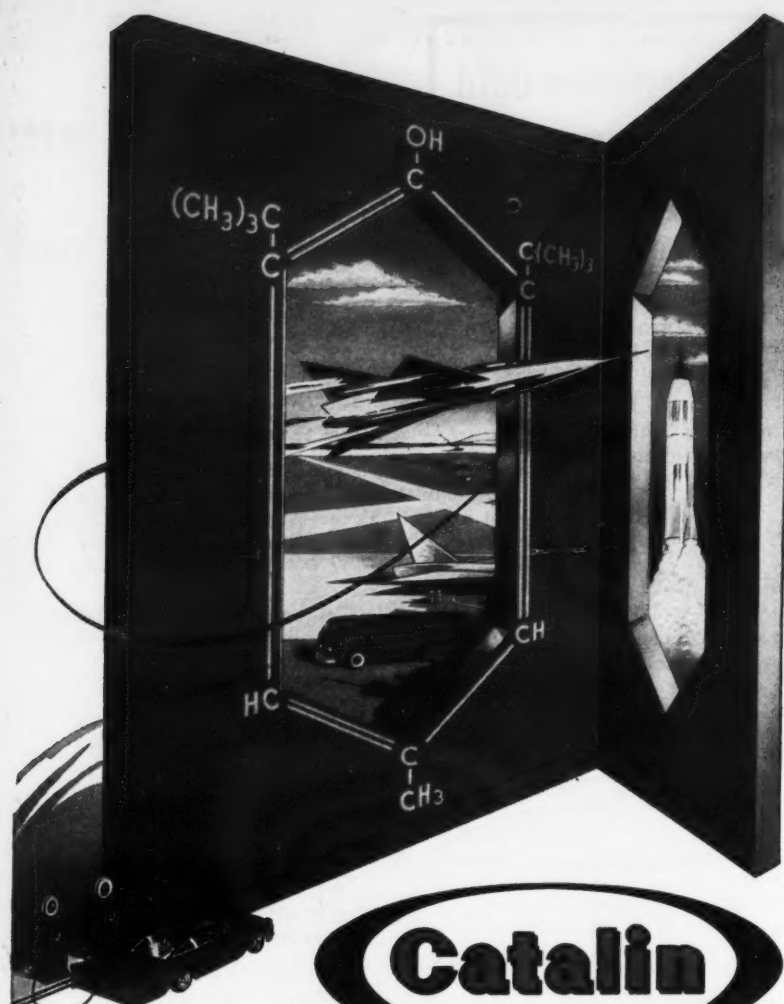
Connect the point of the d scale for 4-inch nominal diameter and D = 75 with a straight-edge.

Read rate of flow of water as 990 gpm on q scale.

LITERATURE CITED:

- 1) BROOKE, M., *Chem Eng*, 64 (1) 264 (1957)





antioxidant CAO-1

98.9% PURE* sets the highest standards for purity and effectiveness

Catalin ANTIOXIDANT CAO-1...the field's finest grade of 2,6-ditertiary-butyl-para-cresol... meets U. S. Government military specifications for use in aviation gasolines, turbine and jet fuels. A major advantage achieved with this heat-resistant, water-insoluble antioxidant is that high-octane fuels are effectively protected, with no loss of octane rating. Gum and peroxide formations are inhibited, and deposits in the aircraft intake manifold and engine are markedly reduced.

Catalin ANTIOXIDANT CAO-1 stabilizes high-octane automotive gasolines, as well as turbine, insulating, hydraulic and transformer oils... in fact, nearly any petroleum hydrocarbon exposed to oxidizing conditions.

Samples, literature and technical assistance wait upon your request. Inquiries invited.

Catalin Corporation of America
One Park Avenue, New York 16, N. Y.

* Typical Analysis

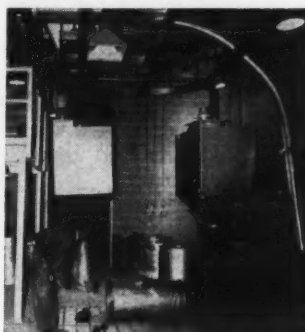
chemicals
plastics
resins

Check 2190 opposite last page

NEW SOLUTIONS

Resin, powdered pewter successfully handled in tube conveyor

Powdered and pebble-sized resin and powdered pewter are being successfully handled by a tubular conveyor at Steen Resin & Chemical Company of Chicago Heights, Ill. Tubular conveyor used is six-inch size with cast-iron flights. It is driven through



Material is introduced to conveyor through grating into sub-floor hopper equipped with revolving crusher

gear reducer at 30 fpm. Products are introduced to unit through grating into sub-floor hopper equipped with revolving crusher.

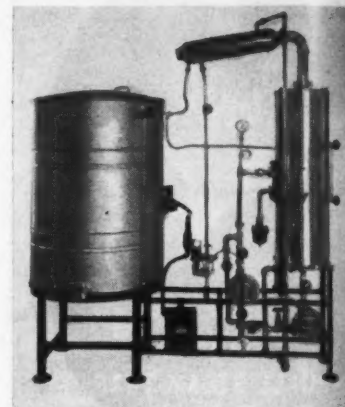
Materials are carried from crusher to ceiling height to discharge section. This section is equipped with positive-discharge vibrator. It is fed to weighing bin which is moved to cookers.

(Series 64 tubular conveyors are product of Hapman Conveyors, Inc., 630 Gibson St., Kalamazoo 6, Mich.)

Check 2191 opposite last page.



PUREST WATER AUTOMATICALLY



Barnstead Still
is SELF-STARTING
SELF-STOPPING
SELF-FLUSHING

It's the most reliable, efficient, and completely automatic method of producing distilled water... no human attention needed. Self-Starting, Self-Stopping, and Self-Flushing controls automatically guarantee a steady supply of distilled water of the highest purity. Catalog "G" provides complete description.

BARNSTEAD
AUTOMATIC PURITY
CONTROL

The Barnstead Puromatic Controller automatically tests each drop of distillate from the Still and permits only distilled water of a predetermined purity to enter the storage tank. Another Barnstead exclusive feature.

**Write for
PURE WATER CATALOGS**

- ☐ Catalog "G"
Barnstead Water Still
- ☐ Catalog 127-A
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Barnstead
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66 Lanesville Terrace, Boston 31, Mass.
FIRST IN PURE WATER SINCE 1878

Check 2192 opposite last page
CHEMICAL PROCESSING

Using three 520,000-gal insulated and refrigerated spheres, balance between low capital costs and flexibility achieved by . . .

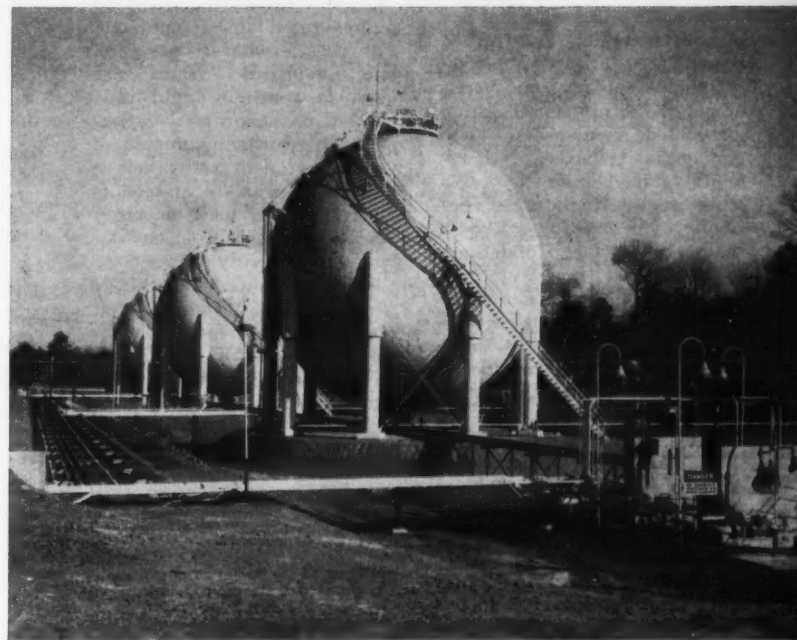
Propane Storage at 35°F

Peak shaving plant also solved difficult pumping problem of handling liquid propane without leakage — has a number of other innovations

Method of storing propane at 35°F and 57 psig — in use at Alabama Gas Corporation's new peak shaving plant at Birmingham — was selected as the most economical for the purpose of the plant. Three 51'-diameter, 520,000 gal (12,000 bbl) insulated and refrigerated spheres are used to store the liquid propane. Propane itself serves as the refrigerant.

In quantities below 10,000 bbl, propane is usually stored

in unrefrigerated vessels designed to withstand 250 psi. Since quantity in this case was considerably larger, vessels designed for a maximum pressure of 75 psig were selected. This lower pressure permitted thinner steel to be used for tanks, with a substantial savings in capital costs. Also, a sphere is the ideal shape of vessel for storage. It will hold a maximum quantity of liquid per lb of metal used.



Three spheres were selected — which are interconnected and yet can be used independently. This gives assurance of operation of most of the plant in event one sphere is not in operation. Hence, flexibility and dependability are also achieved.

Insulation

Three spheres are insulated with 4" of Foamglas embedded in and covered with asphalt. Exterior is coated with a non-bleeding white paint. By maintaining contents of sphere at or above the freezing point of water, many problems associated with colder temperatures, such as the use of a special grade of metal were eliminated.

Plant was built to provide supplementary gas to meet peak demands in cold weather. Propane-air mixture is in-

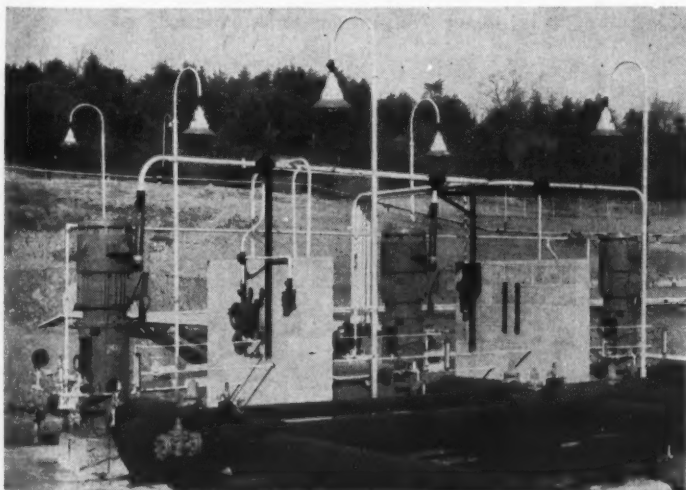
terchangeable with natural gas normally supplied to consumers.

Propane is delivered by tank cars to the sphere storage. When in operation, the liquid propane is pumped from storage and then vaporized in steam-heated units. Propane is mixed with an equal volume of compressed air and metered into natural gas system.

Propane comes into the plant in 10,000-gal tank cars and is normally forced into storage spheres by its own pressure. Occasionally in very cold weather tank car has to be padded with natural gas to force propane into spheres. Any non-condensables which enter storage system are automatically bled from top of spheres.

Refrigeration

Cooling is accomplished by removing propane vapor from top of spheres, compressing it, condensing it in air-cooled



Vertical centrifugal pumps handle liquid propane without leakage

Propane Storage — From preceding page

condenser coils, and expanding liquid back to sphere pressure. Four refrigeration units are used, one for each sphere and one as a spare. Overall capacity of each unit is about 25 tons of refrigeration. Each compressor employs Freon as a refrigerant and has an oil separator and return system.

Compressed propane vapor at about 225 psig enters three air-cooled condensers. Each condenser consists of horizontal finned coils set at a slight angle. Air is forced vertically over coils by a $7\frac{1}{2}$ -hp motor-driven fan. Condensers are designed for 20°F approach to ambient temperature of 100°F. Air-cooled condensers were chosen since water cooling was considered undesirable due to the possibility of freezing and increased maintenance.

Liquid propane from condensers passes through a small centrifugal separator where any water present is separated and drained manually. From separator, liquid goes through pipe back to top of spheres, where it is expanded through back-pressure regulator into spheres.

About five tons of refrigeration is required to handle heat gain from sun load on each sphere. Major heat gain is from unloading tank cars. Sphere contents are automatically maintained at 57 to 60 psig by pressure-actuated switches which turn refrigeration compressors and condenser fan motors on or off. Although temperature of liquid propane in spheres is

about 35°F at vapor-liquid interface, it is about 26°F at bottom of sphere due to gravity stratification.

Liquid Propane Pumps

Three vertical centrifugal pumps rated at 105 gpm and 210 psig discharge pressure, one serving as a spare, are used to transfer liquid propane from spheres to vaporizers. Intermittent pumping of propane at near saturation is a difficult problem and leakage of pumps used at other such installations has occurred frequently.

Vertical centrifugal pumps were selected due to their ability to pump large quantities at low NPSH conditions. In an effort to solve the leakage problem, double mechanical seals are used on the pumps, with oil under pressure on outer seal. Thus far the pumps have performed admirably.

Pumps are primed by an equalization line from the discharge of the pumps back to the spheres and/or by bleeding to a flare. Propane from discharge of pumps goes to the vaporizers. The constant pressure is maintained on line to vaporizers by spilling excess liquid through a pressure-actuated control valve back to the top of the spheres.

Vaporizers

Two horizontal, U-tube, steam-heated units are used to vaporize the propane. These vaporizers are operated at 28,-

000 lbs/hr of propane. A shell-and-tube heat exchanger is used to superheat the propane vapor by about 25°F. This unit is oversized for projected expansion program as are the propane and air-sendout lines.

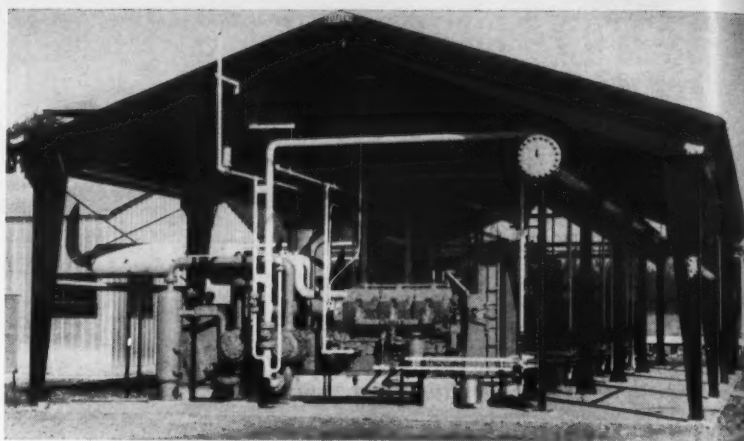
Propane is vaporized at about 185 psig and 105°F. Liquid level in the vaporizer is maintained constant by level controller acting on a liquid unit control valve. A large vapor space above the liquid in horizontal vaporizers prevents carry-over of liquid with the vapor. Steam at about 15 psig is automatically fed to vaporizer by a control valve actuated by propane vapor pressure in vaporizer.

Boiler house is an enclosed prefabricated building and contains two 350-hp, 100-psig, automatic steam package boilers. Oil serves as fuel for units.

Four horizontal, balanced, opposed, double-acting air

compressors furnish air for mixing with propane. Each compressor is rated at 1580 cfm with a 180-psig discharge pressure. Each unit is driven by 500-hp gas engine. Separate radiators are used for cooling the engine and air compressor. Dual regulators on each engine carburetor afford automatic switch-over from natural gas to propane for driving the engine. A propane line from the spheres and from the vaporizers supply propane to the engine.

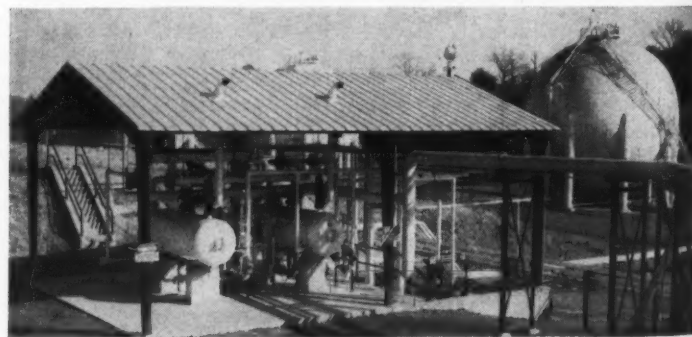
Variation in plant output is accomplished by using any combination of the four air compressor units or by varying the speed of any engine. Engines are started by air-starter motors, actuated by a small reciprocating air compressor, to feed two 20-cu-ft air tanks. After one engine is started, the other engines can be started from the air generated by the large compressor. Natural gas pressure also



Four horizontal compressors driven by gas engines furnish air for mixing with propane



Four air condensers handling propane at 225 psig are located behind refrigeration units



Two horizontal, U-tube units vaporize propane, which is then superheated in overhead heat exchanger

may be used to actuate the starting motors.

Air from the compressors at 180 psig is mixed with propane vapor from the superheater in a pipe tee. The mixture then proceeds past control house and flow is measured by a displacement meter. Natural gas at low pressure is used instead of air on all pneumatic instruments. The extremely dry gas is well suited for this application.

(Plant was designed by Alabama Gas Corporation and the Birmingham office of Rust Engineering. Construction work was done by The Rust Engineering Company, 2316 Fourth Ave., North Birmingham 3, Ala. or 930 Fort Duquesne Blvd., Pittsburgh 22, Pennsylvania.)

Check 2193 opposite last page.

(Spheres were fabricated by Chicago Bridge & Iron Company's Birmingham, Ala., plant and erected by their Southern erection organization. For further information contact Chicago Bridge & Iron Company, 332 S. Michigan Ave., Chicago 4, Ill.)

Check 2194 opposite last page.

(Air-cooled condensers are a product of Buffalo Forge Company, 490 Broadway, Buffalo 5, N. Y.)

Check 2195 opposite last page.

(Vertical centrifugal pumps are product of Pacific Pumps, Inc., One of the Dresser Industries, 5715 Bicket St., Huntington Park, Calif.)

Check 2196 opposite last page.

(Vaporizers and propane gas superheater are products of Davis Engineering Corp., Div. of American Metal Products Company, 30 Rockefeller Plaza, New York 20, N. Y.)

Check 2197 opposite last page.

(Horizontal air compressors are product of Clark Bros. Co., One of the Dresser Industries, Olean, N.Y.)

Check 2198 opposite last page.

Valves made of bronze and steel of a number of different types are illustrated and described in 86-page catalog. Cat 200A — Manning, Maxwell & Moore, Inc., Stratford, Conn.

Check 2199 opposite last page.

See why ALCOA ALUMINUM makes a good design habit

Requirement: low-cost, high-strength, corrosion-resistant process pipe and tubing

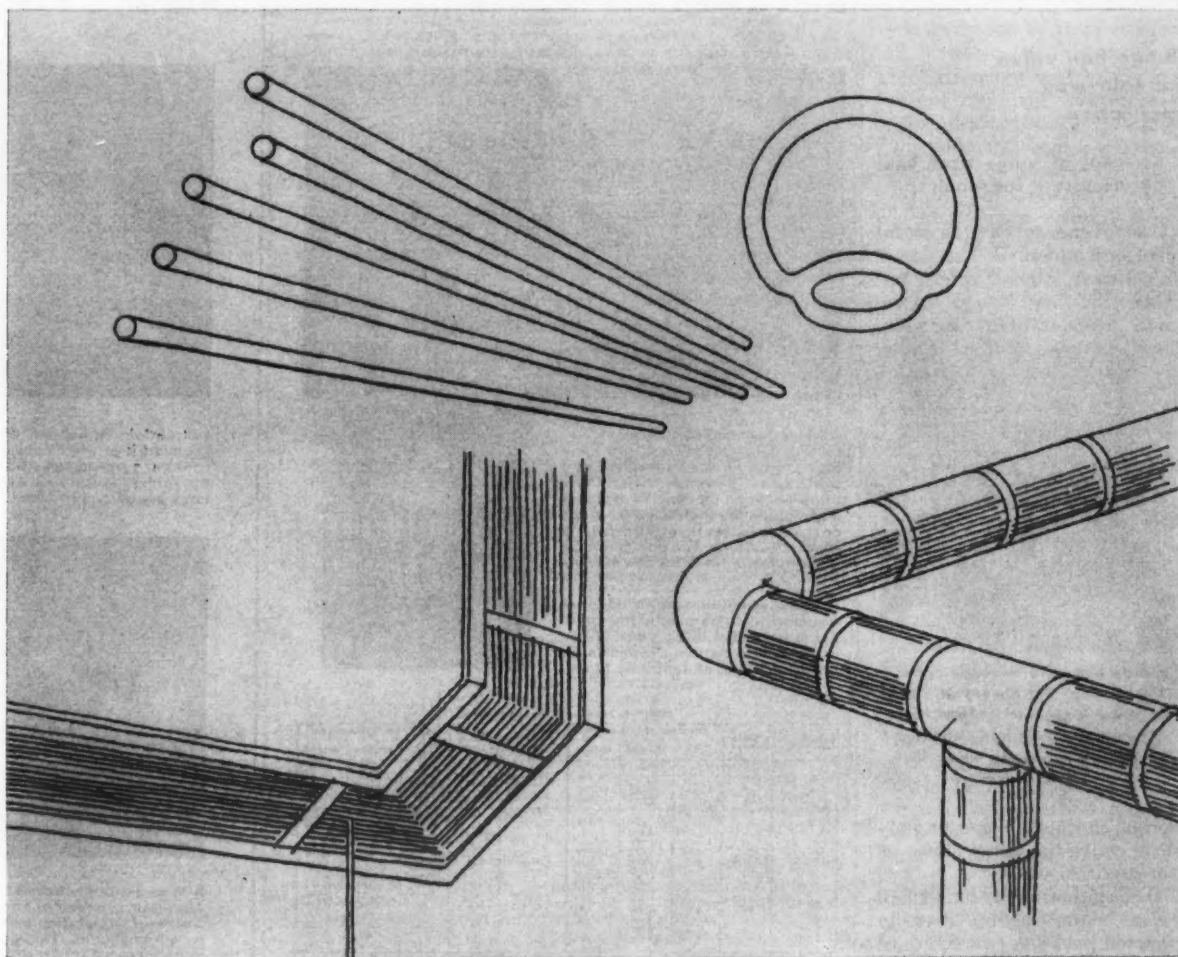
Key to good design: specify tubular products of Alcoa Aluminum

Metal tube or pipe is perhaps the most common material to be found in chemical and petroleum processes. It carries process liquids and gases through each stage of production. It serves in instrumentation lines, relaying information between controls and valves. It is the heart of heat exchangers and other processing equipment. Specify ALCOA® Aluminum Pipe and Tube to do all these jobs safely and economically.

ALCOA aluminum tubular products have a long record of reliability in process applications. No other pipe or tube matches their resistance to corrosion from such a wide range of chemicals and petroleum products. No

other metal approaches their low cost and freedom from maintenance. No other tube or pipe combines these features with long life, high strength, and the physical properties required by so many processors.

These pages show you just a few of the applications where ALCOA aluminum tubular products are at work fighting corrosion and providing substantial economies. There is an area in your process where aluminum can help cut costs and improve efficiency. ALCOA makes aluminum pipe and tube in a number of standard alloys and in a wide variety of sizes ideally suited to chemical and petroleum processing.



Check 2200 opposite last page

Natural gas spans ocean in record voyage

First trans-oceanic delivery of liquid natural gas was recently made. A 5000-ton converted dry-cargo ship transported 32,000 barrels of liquid methane from Lake Charles, La., to Canvey Island, England (between London and Southend).

Aluminum tanks were installed in insulated holds of ship. Methane is carried in these without pressure at -258°F. Ship is only prototype of larger vessels to be used in future.

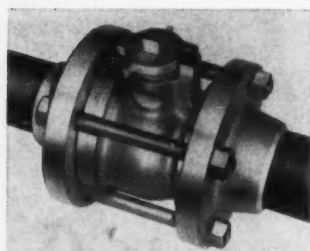
(Liquid-methane tanker is development of Constock International Methane Limited, Joint Subsidiary of Continental Oil Company and Union Stock Yard and Transit Co.)

Flange ball valve has four-way application

Removal of valve from line not necessary for repair

Uses: Line service as both valve and union.

Features: Unit serves as either 150- or 300-lb valve where shorter-than-ASA dimensions are desired. Addition



Flange ball valve serves as either 150-lb (depicted above) or 300-lb valve where shorter-than-ASA dimensions are desired. Addition of spacer converts to either 150- or 300-lb-ASA valve

tion of appropriate spacer converts valve to either 150- or 300-lb-ASA valve.

Description: With flange ball valve, center section is easily inserted between two standard flanges of either 150 or 300 lb. Flanges are then bolted to-



Piping

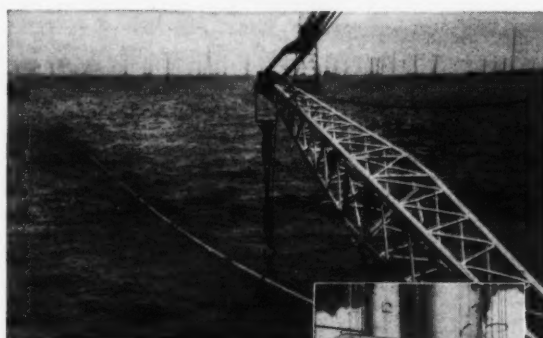
Where product protection, corrosion resistance and strength are primary considerations for piping, aluminum is your best answer, and is often the least expensive.

ALCOA Aluminum Piping resists attack by materials within the pipe, as well as by corrosive environments outside. It does not catalyze the decomposition of many sensitive chemicals as other metals do.

With ALCOA Aluminum Pipe you also get a smooth, low-friction surface, high thermal conductivity and nonsparking characteristics . . . all highly desirable qualities.

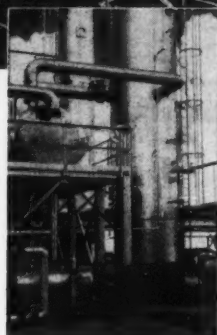
In ultra-low temperature applications ALCOA Aluminum Piping retains its excellent physical properties without embrittlement. Tests to as low as minus 423 degrees F show it actually increases in strength as the temperature drops. That's why aluminum is specified for tonnage oxygen and other cryogenic applications.

ALCOA Aluminum Pipe is produced in ASA sizes from 1/8 in. through 12 in., and in a variety of alloys and tempers, some with the strength of low carbon steel. Seamless pipe in sizes up to 20 in. in diameter is available.



A welded section of 4-in. Alcoa Aluminum Pipe is lowered into Lake Maracaibo, Venezuela, for the world's first permanent aluminum underwater oil pipeline. It replaces a steel pipeline that failed from the corrosive effects of the lake's brackish waters. The line connects an underwater well to a flow station.

Because aluminum piping does not discolor or contaminate the product, it is used at this organic chemicals plant to handle chemicals for the production of synthetic fibers.



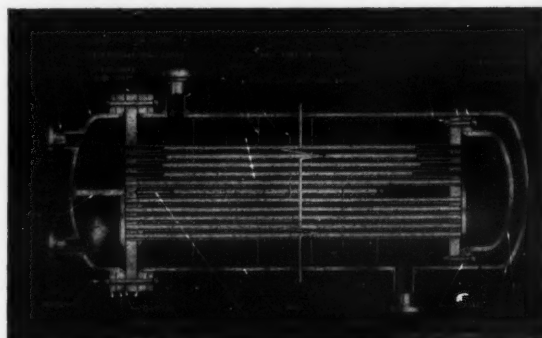
BURSTING PRESSURES Pipe—not welded									
Nominal Pipe Size, Inches	Schedule Number	BURSTING PRESSURE, PSI			Nominal Pipe Size, Inches	Schedule Number	BURSTING PRESSURE, PSI		
		3003-H112	6063-T6	6061-T6			3003-H112	6063-T6	6061-T6
1/8	40	11,900	15,020	2 1/2	5	1,810	2,050	2,050	2,050
1/4	40	11,490	14,490	2 1/2	10	1,790	4,590	5,820	5,820
3/8	40	9,270	11,730	2 1/2	40	1,480	2,160	2,160	2,160
1/2	40	8,880	11,220	3	5	1,550	3,980	5,050	5,050
3/4	10	5,180	6,130	3	10	1,420	3,630	4,600	4,600
1	40	2,220	5,130	3 1/2	40	1,150	1,670	2,280	2,280
1 1/4	5	3,160	5,550	4	5	1,150	1,670	2,280	2,280
1 1/2	10	2,630	4,250	4	10	1,390	3,370	4,280	4,280
2	40	2,480	4,250	4	40	1,150	2,950	3,750	3,750
2 1/2	5	2,160	5,550	5	5	1,150	1,670	2,280	2,280
3	10	2,160	5,550	5	10	1,050	2,680	3,410	3,410
3 1/2	5	2,160	5,550	5	30	790	2,020	2,560	2,560
4	10	1,940	4,990	6,320	40	920	2,360	2,990	2,990
4 1/2	5	1,720	4,990	6,320	10 (278)	630	1,630	2,070	2,070
5	10	1,630	4,190	5,320	10 (307)	700	1,790	2,280	2,280
6	10	1,630	4,190	5,320	10 (365)	835	2,140	2,720	2,720
8	10	1,630	4,190	5,320	12 (375)	720	1,850	2,340	2,340

Computed bursting and yielding pressures and conversion factors for 3003-H112 alloy also apply to 3003-F alloy. They are based on the properties of the 3003-O alloy.

Heat exchanger tubing

Corrosion resistance, long life, product purity, high thermal conductivity and economy . . . all these vital requirements in heat exchanger design are satisfied when you specify ALCOA Aluminum Tubing. The petroleum industry uses aluminum in main column overhead condensers where its freedom from fouling and excellent heat transfer properties have made it a natural selection. Heat exchangers with ALCOA Aluminum Tubing also are used in the chemical process industry. Prime examples are for the production of ammonia, nitric acid, vegetable oils, naval stores, naphthalene, hydrogen peroxide, oxygen and urea. These and other processes call for heat exchanger tubing with high strength, excellent sub-zero physical properties, high thermal conductivity, or nontoxicity and noncatalytic properties. Any one or a combination of these requirements can be met efficiently and economically with ALCOA Aluminum Tubing.

ALCOA Aluminum is the least expensive tube available. In the common sizes it costs one-third less than mild steel, one-half as much as admiralty, and only one-fifth as much as stainless.



For certain processes where corrosive or sensitive materials are involved it is often advisable to use aluminum for entire heat exchanger systems to avoid system corrosion and contamination of the product. A typical heat exchanger is shown here. Alloy recommendations are given in "Alcoa Aluminum Heat Exchanger Tubes."



A Midwest utility saved 50 per cent on tubing costs by using ALCOA Aluminum instead of admiralty for tubing in this surface condenser. Successful operation of this unit has led to installation of similar units by other utilities. This use demonstrates aluminum's economy and superior resistance to ammonia, carbon dioxide and hydrogen sulfide.

See why ALCOA ALUMINUM makes a good design habit

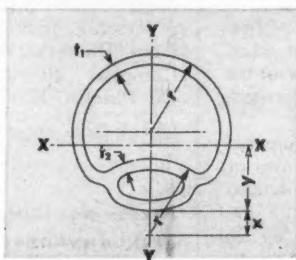
Unitrace the aluminum process pipe with integral steam tracing

ALCOA® Unitrace solves the problem of applying heat to a product during processing. With Unitrace you get standard pipe OD with an integral steam passage located adjacent to the product passage . . . eliminating the labor and cost involved in installing external steam jackets or steam tracer tubes.

Extruded as a single unit of ALCOA 6063-T5 aluminum alloy, Unitrace has aluminum's natural corrosion resistance, making it ideal for transferring molten sulfur, ammonium nitrate solutions, glacial acetic acid, fatty acids, naphthalene, phthalic anhydride, urea, wax, tar products, and numerous other products which must remain liquid during transfer.

ALCOA continues to be the leader in supplying various sizes of this type of pipe. You can get Unitrace in pipe sizes from 1 in. through 8 in.

Because Unitrace is completely compatible with other piping systems, it provides an unusual degree of design flexibility in process systems. Special Unitrace flanges, trace-caps, elbows and adapter flanges, cast of ALCOA A356-T7 aluminum alloy, are available from ALCOA.



Unitrace Sizes		1 in.	1½ in.	2 in.	3 in.	4 in.	6 in.	8 in.
Axis XX	Moment of Inertia (I) in. ⁴	.09	.34	.72	2.71	6.52	31.82	81.82
	Radius of Gyration (R) in.	.37	.58	.72	1.09	1.42	2.12	2.78
	Section Modulus (S) in. ³	.13	.34	.56	1.42	2.65	8.73	17.22
Axis YY	Moment of Inertia (I) in. ⁴	.09	.33	.70	2.65	6.36	29.72	76.70
	Radius of Gyration (R) in.	.37	.57	.71	1.08	1.40	2.05	2.69
	Section Modulus (S) in. ³	.14	.34	.59	1.52	2.83	8.97	17.79

Sizes	1 in.	1½ in.	2 in.	3 in.	4 in.	6 in.	8 in.
r	.657	.950	1.187	1.750	2.250	3.312	4.312
t ₁	.133	.145	.154	.170	.187	.280	.322
t ₂	.145	.163	.174	.185	.200	.307	.354
x	.133	.344	.406	.625	.813	1.500	2.000
z	.61	.87	1.08	1.59	2.03	2.98	3.87

Average coefficient of thermal expansion (per °F)	-55 to +58°F	58 to 212°F	212 to 392°F	392 to 572°F
	12.1 x 10 ⁻⁶	13.0 x 10 ⁻⁶	13.6 x 10 ⁻⁶	14.2 x 10 ⁻⁶

Temp. °F	Pressure psi	1 in.	1½ in.	2 in.	3 in.	4 in.	6 in.	8 in.
Up to 100°F	Bursting Pressure of Product Line	2980	2265	1925	1425	1210	1210	1085
	*Pressure Differential	2240	1700	1445	1070	910	910	815
	Bursting Pressure of Trace Line	2980	2265	1925	1425	1210	1210	1085
	Bursting Pressure of Product Line	2800	2130	1810	1340	1140	1140	1020
200°F	*Pressure Differential	2100	1600	1360	1005	855	855	765
	Bursting Pressure of Trace Line	2800	2130	1810	1340	1140	1140	1020
	Bursting Pressure of Product Line	2530	1920	1630	1210	1030	1030	925
	*Pressure Differential	1860	1410	1200	900	755	755	675
300°F	Bursting Pressure of Trace Line	2530	1920	1630	1210	1030	1030	925
	Bursting Pressure of Product Line	1340	1020	865	650	545	545	490
	*Pressure Differential	670	510	435	320	275	275	245
	Bursting Pressure of Trace Line	1340	1020	865	650	545	545	490

*The pressure in the product line should not exceed the pressure in the trace by more than this amount.
Note: Bursting pressure data based on tests with welded Unitrace flanges and minimum mechanical properties.

Utilitube for instrument, hydraulic, fuel and lubricating lines

Utilitube is a low-cost coiled tube made of 5050 aluminum alloy. Literally millions of feet of it have been installed for the above applications. For these and other uses Utilitube provides outstanding economy along with such desirable physical properties as corrosion resistance, freedom from gum or sludge formation, high fatigue strength, good bursting strength and easy workability.

Utilitube can be supplied in economical, long lengths up to 1,000 feet or more. It weighs only one-third as much as copper tubing of similar capacity and costs up to 40 percent less.

Utilitube can be joined by all common methods. Standard compression-type or flare-type fittings may be used. Utilitube can be flared easily, using conventional tools and practices. Installation methods are similar to those used with other types of tubing.

Gas and oil processing plants use large quantities of Alcoa Utilitube for instrument air lines. The corrosive atmospheres of hydrogen sulfide and sulfur dioxide in these areas have no effect on Utilitube. In addition to its resistance to corrosion, Utilitube has superior physical properties at sub-zero temperatures. That's why more and more of it is being used for cryogenic processes. In this application, its physical properties actually improve as the temperature drops.



BURSTING PRESSURES AND WEIGHTS PER FOOT OF TYPICAL SIZES OF ALCOA UTILITUBE®

Computed Bursting Pressures based on minimum properties at operating temperatures not exceeding 100°F.

OD, in.	Wall Thickness in.	Computed Bursting Strength ^① , psi	Weight per Foot ^② , lb
1/8	0.025	7380	0.0091
3/16	0.028	5260	0.0163
1/4	0.032	4420	0.0255
5/16	0.035	3810	0.0355
3/8	0.049	4520	0.0584
1/2	0.035	3130	0.0435
5/8	0.049	3300	0.0808
3/4	0.035	2300	0.0595
	0.049	2590	0.1032
	0.058	2550	0.1468

① B50S-O

② $P = K \frac{2t}{D - 0.8t}$ in which S=18,000 psi specified minimum longitudinal tensile strength, D=nominal outside diameter in inches, t=nominal thickness in inches, and K is a factor dependent on yield-tensile strength ratio (K=0.86 for B50S-O).

③ Based on 0.097 lb per cu in., from "Alcoa Aluminum and Its Alloys," 1950, page 108, Table 13.

gether for assembly of unit.

Any media within pressure-temperature limitations of seats, O-rings, and body materials can be handled by valve. Removal from line is not necessary for replacement and/or maintenance of parts.

Valve is available in three-, four-, and six-inch sizes. It comes in bronze, aluminum, carbon steel, 303 stainless steel, or 316 stainless steel. Seating materials are buna-n, neoprene, Teflon, or nylon. O-ring materials can be same as those for seat except for nylon.

(Flange Econ-O-Miser ball valve is product of Worcester Valve Co., Inc., 16 Parker St., Worcester, Mass.)

Check 2202 opposite last page.

Marriage of beauty, utility in refinery control center

Symmetry and good design were obtained without sacrifice of functional requirements in refinery control center recently constructed for La Gloria Oil and Gas Company's Tyler, Texas, refinery. Center



Circular air-conditioned building houses refinery control center at La Gloria Oil and Gas refinery

is circular air-conditioned building with double-glass insulating walls enclosing a room nearly 50' in diam.

Three control panels, facing outward on sides of equilateral triangle are connected at ends by wall panels to form central hexagonal service room. Each operator has panoramic view of refining unit under his control.

(Refinery control center was constructed by Blaw-Knox Company, 1204 Blaw-Knox Building, Pittsburgh 22, Pa.)

Check 2203 opposite last page.

Check 2200 opposite last page

Pipe jacking

Pipe jacking made with ALCOA Aluminum Foil or sheet protects insulated process pipes both indoors and outdoors. In many cases it actually costs less to cover pipes with this material than it does to paint them. Aluminum pipe jacking has required no maintenance for as long as 10 years in some applications. This jacking resists corrosion and can be used with a moisture barrier over any type of insulation. It is available with or without a moisture barrier attached.

Aluminum jacking is easy to cut and handle, and can be installed quickly and easily without special tools or skills.



UNISTRENGTH Pipe newest tubular product of Alcoa Aluminum



ALCOA developed this new type of aluminum pipe to make possible welded lines with uniform bending, bursting and tensile strength throughout. The secret of UNISTRENGTH is a reduction in wall thickness everywhere but at the ends where it is needed for joining. This compensates for the local reduction in strength caused by the heat of welding on popular heat-treatable pipe alloys. Result: ALCOA eliminates unneeded metal (up to 40 per cent) to provide a uniformly strong piping system with important savings in weight and cost.

ALCOA ENGINEERS have worked closely with all segments of the process industries for over 40 years, and can help you specify the aluminum tubular product best suited for your process application. ALCOA's unparalleled experience in this field is available to you for the asking. Write to the address below, stating your requirements as specifically as possible. ALCOA's development engineers will welcome the opportunity to work with you on your problems.

You can also take advantage of the wide selection of free ALCOA literature on aluminum tubular products and other process applications. Simply check the booklets you want on the coupon and mail to the address below. ALCOA will forward your material promptly and without obligation.

During 1959, ALCOA will conduct engineering conferences in a number of major cities on process industries uses of aluminum. Call your nearest ALCOA sales office for details.

Aluminum Company of America, 872-F Alcoa Building, Pittsburgh 19, Pa.

Please send me the following literature covering Alcoa Aluminum for tubular products and other uses in the process industries:

- | | |
|---|---|
| <input type="checkbox"/> 10197 Aluminum Pipe and Fittings | <input type="checkbox"/> GL86C Unfired Pressure Vessels of Aluminum Alloys |
| <input type="checkbox"/> 34-10418 Alcoa Unitrace: Combines Piping and Tracing in One Unit | <input type="checkbox"/> GL149 Welded Aluminum Gas Cylinders, ICC Approved |
| <input type="checkbox"/> 10186 Alcoa Aluminum Heat Exchanger Tubes | <input type="checkbox"/> 20437 Aluminum Alloy Heat Exchangers in the Process Industries |
| <input type="checkbox"/> 10270 Alcoa Utilitube | <input type="checkbox"/> DD508 Aluminum Alloys in Tank Trucks and Tank Trailers |
| <input type="checkbox"/> GL88C Aluminum Pipe for Aircraft Fuel | <input type="checkbox"/> 10387 Alcoa Standard Storage Tanks |
| <input type="checkbox"/> 10460 Process Industries Applications of Alcoa Aluminum | <input type="checkbox"/> 20272 Aluminum Alloys for Handling High Purity Water |
| <input type="checkbox"/> 10508 Cleaning and Maintenance | <input type="checkbox"/> 20268 Resistance of Aluminum Alloys to Fresh Waters |
| <input type="checkbox"/> 20849 Resistance of Aluminum Alloys to Weathering and Resistance of Aluminum Alloys to Chemically Contaminated Atmospheres | <input type="checkbox"/> 10130 Forming Alcoa Aluminum |
| <input type="checkbox"/> 20265 Have You Tried Aluminum in Your Refinery? | <input type="checkbox"/> 10416 Brazing Alcoa Aluminum |
| <input type="checkbox"/> 20935 Designing to Prevent Corrosion | <input type="checkbox"/> 10415 Welding Alcoa Aluminum |
| | <input type="checkbox"/> 10051 Alcoa Aluminum Handbook |

Name _____
 Company _____
 Title _____
 Address _____
 City _____
 State _____

Check 2200 opposite last page

PETROCHEMICALS

Computer-operated control of continuous processing

Successful pilot-plant application of first computer-operated control system for continuous processing was recently announced.

Development is expected to broaden application for continuous processes by controlling operations too complex for previously available systems.

For the first time refiners will have access to advantages of electronic-computer control applied to processes by companies highly skilled in petroleum, petrochemical, and electronic fields.

(Electronic-computer-control systems are product of Daystrom Systems, Inc., Division of Daystrom, Inc., 5640 La Jolla Blvd., La Jolla, Calif.)

(Further information concerning electronic-computer control systems for continuous processing may be obtained from Universal Oil Products Company, 30 Algonquin Rd., De Plaines, Ill.)

Check 2205 opposite last page.

Excess clearance reduced in fluid cylinder of small pump

Triplex power pump has alleviated small-capacity pump excess-clearance problem. Inlet-loss reduction cuts the volumetric clearance in fluid cylinder. Cylinder has inlet valves operating in line with plungers and inlet flow directly in line with plungers.



Pump is designed for high output

Power-end features include Meehanite power-frame casting, forged-steel crankshaft, Timken roller-crankshaft bearings, and forged-steel connecting rod.

Pump has continuous input rating of 10 hp and is rated

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 watch "ALCOA THEATRE."
 alternate Mondays,
 NBC-TV, and
 "ALCOA PRESENTS"
 every Tuesday, ABC-TV

to 12½ hp for 10 hr/day equivalent for intermediate service. Continuous plunger load rating at normal hp is 1100 lb, but pump will handle intermediate service up to 1375 lb.

Pump can be obtained with direct drive to crankshaft by feed belts, chain drive, gear motor, or variable drive. It is available for top motor mounting with adjustable mounting plate for power requirements up to 10 hp.

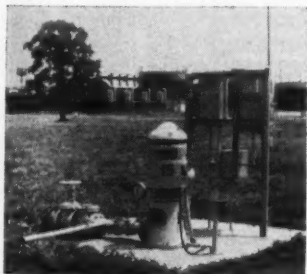
(TX-10 triplex power pump is product of Union Steam Pump Co., Battle Creek, Michigan.)

Check 2206 opposite last page.

Continuous service given by turbine pumps handling water

Ten turbine pumps are used to supply water for nitrogen-product processing at Allied Chemical's nitrogen plant in South Point, Ohio.

Turbines pump underground water to supplement river-water supply. Pumps have 80' settings and are capable of



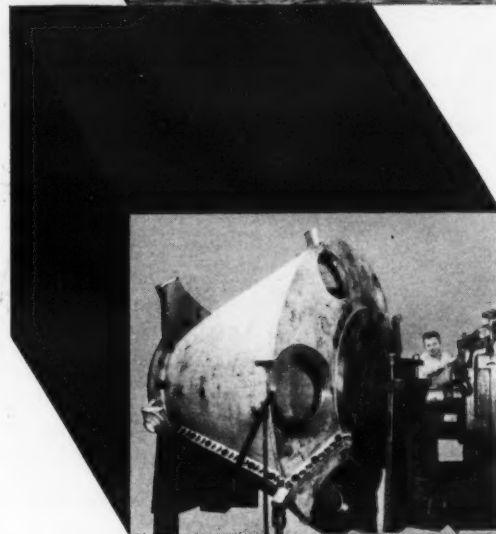
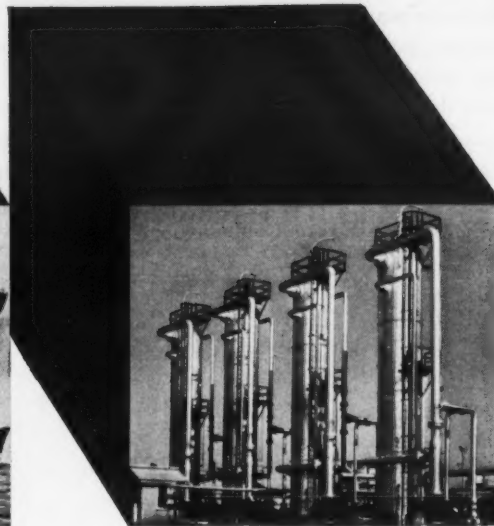
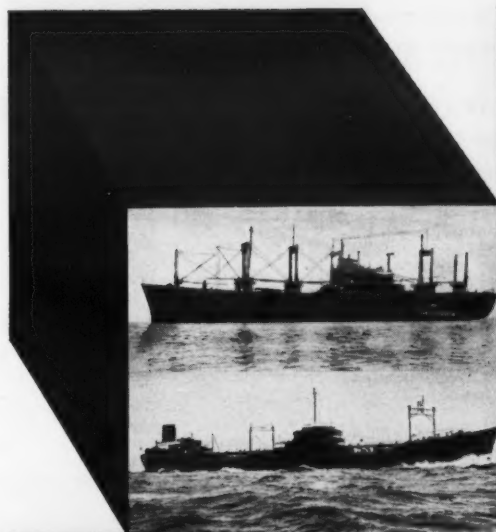
Turbine pumps have capability of 125 gpm

pumping 125 gpm. They provide dependable, 24-hr-a-day, seven-day-a-week operation.

In plant, nitrogen is taken from air and hydrogen is taken from natural gas and steam. They are combined under high pressures and temperatures to form ammonia. From this, many industrial and agricultural products are made.

(Turbine pumps are product of The Deming Company, Salem, Ohio.)

Check 2207 opposite last page.



MASTER BUILDERS FOR LAND AND SEA

For more than forty years, engineering leaders in the oil-refining and chemical industries have been calling upon Sun Ship for important components for the building of large plants.

- Manufacturing and fabricating skill that has kept pace with the growth of their great industries . . . and understanding of their problems.
- Facilities and craft skills that can produce . . . and deliver . . . the equipment needed—swiftly.
- A special . . . separate . . . Alloy Products Shop equipped to produce medium and heavy stainless alloy and aluminum products for industry.

BUILDING FOR LAND Pressure Vessels • Fractionating Towers • Stills and Tanks • Condensers and similar equipment • Special Machinery • Plate Work, etc.

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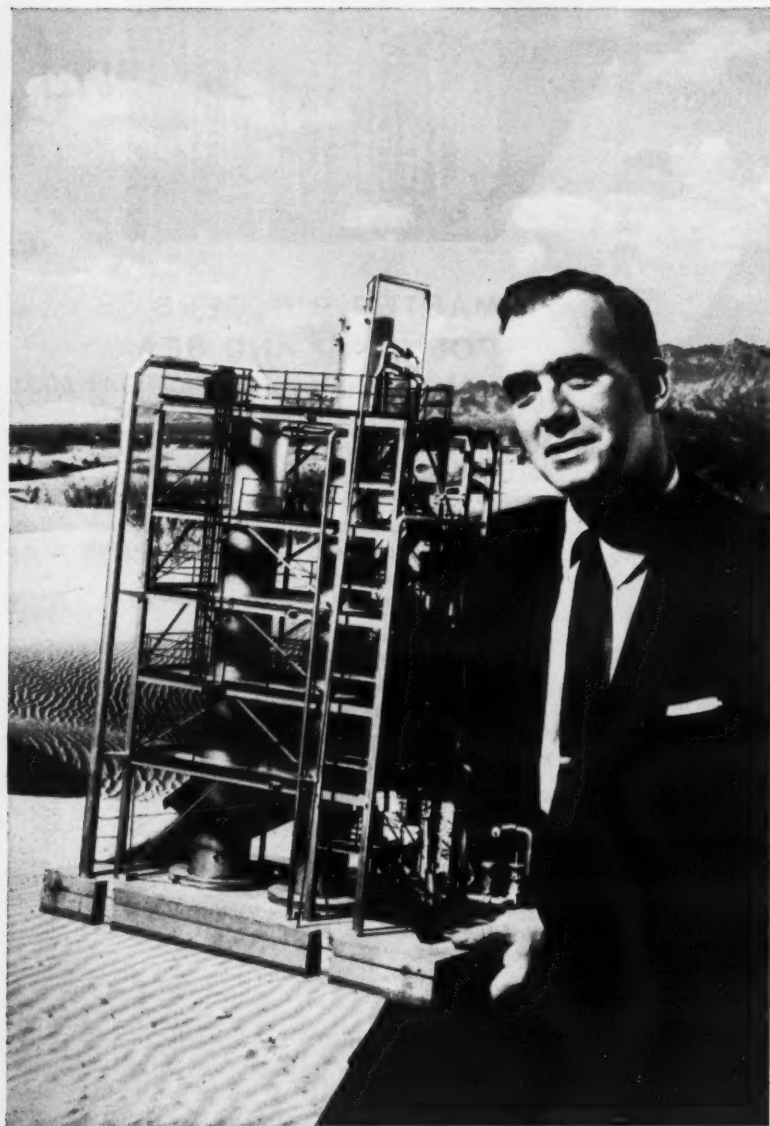
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Check 2208 opposite last page

KEEP YOUR PLANT DESERT-DRY WITH LECTRODRYERS

—It's like taking your plant to the desert if you eliminate unwanted moisture with Lectrodryers. Controls work smoothly and dependably when instruments are fed dry, clean air. Processes stay on the beam and product quality is consistently high, when the air, gases or organic liquids involved are dry. Desert dryness in warehouses safeguards products stored there.

Lectrodryers dry to dewpoints below -110°F. —in volumes of a few cubic feet or thousands per hour. Operation can be fully automatic or manually controlled. Quite likely, there are standard units to suit your needs, or we can recommend special equipment. For this help, write Pittsburgh Lectrodryer Division, McGraw-Edison Company, 352 32nd St., Pittsburgh 30, Pa.



Lectrodryer[®]

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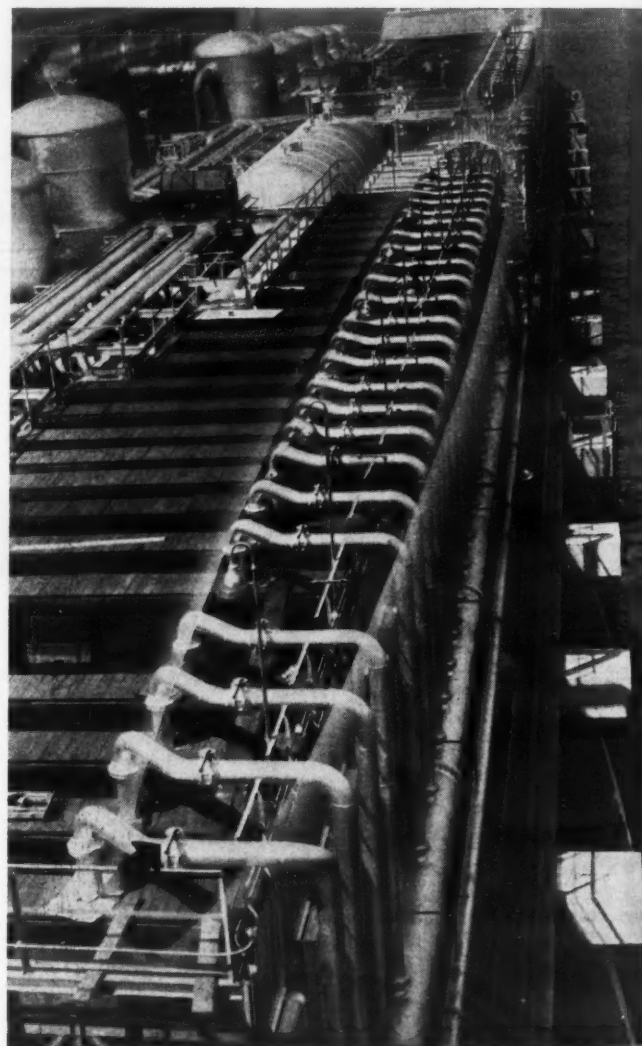
Check 2209 opposite last page

PETROCHEMICALS

Used on world's largest gas conservation plant
on Lake Maracaibo in Venezuela —

Resilient-seated butterfly resist salt-water

GORDON WEYERMULLER
Petrochemical Editor

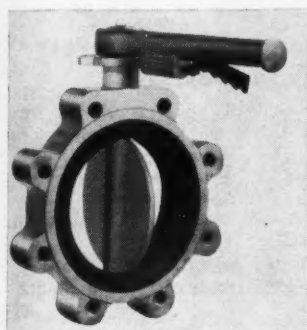


Gas conservation plant uses 24 butterfly valves (arrow) on row of gas coolers in foreground. Another row can be seen in rear

fly valves er corrosion

PROBLEM: Large gate valves handling brackish water for Creole Petroleum Corporation have corroded rapidly in a number of cases, basic cause of trouble being electrolysis. Temporary repairs have been made to interior of some of these valves with a plastic protective coating. However, this is not a permanent solution to problem.

Use of an alloy trim to



Top plate of butterfly valve is notched for throttling

better withstand corrosion ups the cost of a valve of this type and the desired performance still is not always obtained.

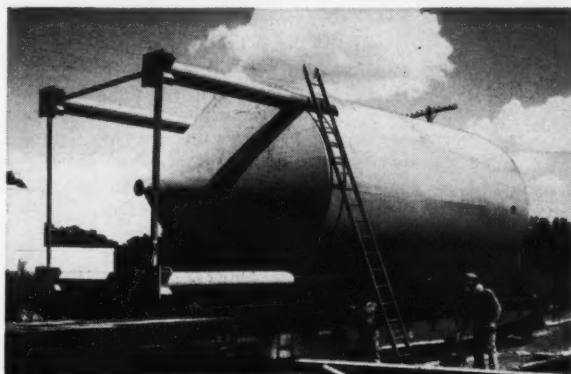
Solution: To achieve satisfactory service with economy, resilient-seated butterfly valves were installed in company's \$28 million gas conservation plant at Lake Maracaibo. This plant, called Tia Juana 2, is the largest installation of its kind in the world. It is designed to inject 300 million cu ft of gas daily back into the earth. This conserves gas and serves to increase oil production through maintenance of pressure.

Plant is located seven miles from shore on a platform 440' long and 131' wide. Brackish

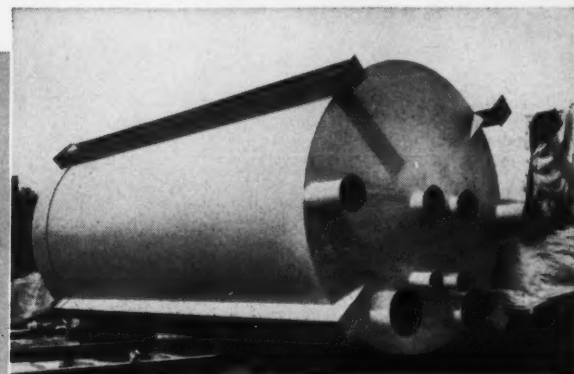
In Custom Fabrication of CODE TANKS and PRESSURE VESSELS

there is no substitute for *Experience*

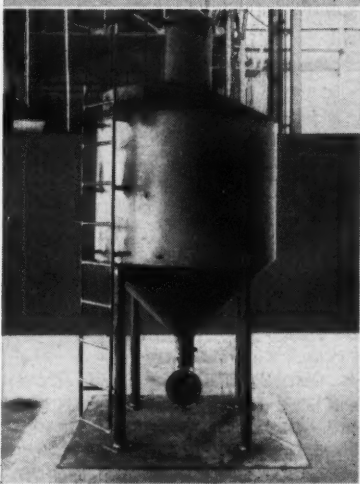
Modern Welding offers a wealth of experience in custom fabrication. Our well equipped strategically located plants serve chemical processing and petroleum industries throughout the world. Our facilities are at the disposal of the men who design, construct, operate and maintain processing plants.



Sludge Settler tank for petrochemical plant is the first in this revolutionary new design.



Dual purpose phenolic-lined polyethylene storage tank with structural reinforcements.



Calibration and prover tank for measuring the accuracy of pipeline crude oil meters.



Air receiver tanks for compressor stations. Pressure tested in 450 lbs. of hydrostatic pressure conforming to A.S.M.E. 1952-A code. Each X-ray tested.



MODERN WELDING COMPANY

INCORPORATED

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Check 2210 opposite last page

The Problem:

Protection against
product contamination
... confinement of
obnoxious vapors.



**G-B Supplied the answer
with this INTERNALLY
Jacketed Flaker**

The unit shown is fitted with a G-B internally jacketed fabricated drum 60" diameter by 120" long having a polished chrome plated surface. A stainless steel steam jacketed feed pan and stainless steel vapor enclosure protect against product contamination and confine obnoxious vapors.

This is another application where G-B equipment was selected. More detailed information on request.



GOSLIN-BIRMINGHAM
MANUFACTURING CO., INC.
BIRMINGHAM, ALABAMA

**FILTERS • EVAPORATORS
PROCESS EQUIPMENT
CONTRACT MANUFACTURING
including HEAVY CASTINGS**

Check 2211 opposite last page

PETROCHEMICALS

lake water is pumped through piping to top of gas coolers. Each gas cooler uses a butterfly valve in pipeline.

Plant uses 28 butterfly valves of 8" size and 38 of 10" size. Bodies are malleable iron, cadmium plated. Valves have aluminum-bronze discs, 316 stainless steel stem, and brass bushings. Top plate is notched for throttling.

Replaceable, resilient seat not only seals on vacuum and pressure, but also acts as a gasket between flanges.

Results: Butterfly valves have performed satisfactorily handling the brackish water since placed in service in June 1957. They have been found to be very good from the standpoint of corrosion. In view of their good performance, butterfly valves have also been used on another gas conservation plant built by Creole.

In addition to performing as well or better in this service, it has been found that cost of butterfly valves runs one-third to one-half less than an alloy-trimmed gate valve.

(Resilient-seated butterfly valves are product of Keystone Valve Corp., PO Box 6716, Houston 5, Texas.)

Check 2212 opposite last page.



Synthetic-rubber dryer,

... of direct-gas-fired three-pass type, was recently installed at Sarnia, Canada, plant of Polymer Corporation, Limited. Unit is said to be world's largest of its type.

Two gas burners supply heat source. Dryer can be brought to working temperature within 10 minutes. Design allows complete accessibility.

(Synthetic-rubber dryer is product of C. G. Sargent's Sons Corporation, Graniteville, Mass.)

Check 2213 opposite last page.



... in dry
dust control

**HIGH EFFICIENCY
DUCLONES®**

**assure maximum recovery
at lowest cost**

DUCLONES—Ducon high efficiency cyclones—are designed and constructed for high recovery efficiency and low gas resistance. Their sturdy construction assures long, continuous service with a minimum of maintenance.

The exceptional performance of Duclone collectors is the result of these 6 unique features:

1. Small Diameter produces high efficiency
2. Helical Roof provides a turbulence-free path for the entering gas stream
3. Steep Cone improves dust separation
4. Dust Trap assures efficient dust removal from the cone
5. Vortex Shield prevents re-entrainment of dust in upward gas vortex
6. Scroll Outlet provides a low resistance clean gas outlet

send for Bulletin C-958.



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name in
DUST
CONTROL

**THE
Ducon COMPANY, INC.**
147 EAST SECOND STREET • MINEOLA, L. I., NEW YORK

Check 2214 opposite last page

CHEMICAL PROCESSING

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Then make use of the Reader Service slip in this issue.

It's easy . . .

to use and can save time. Every month you will find a number at the end of each article or advertisement. Find this number on the slip and check it.

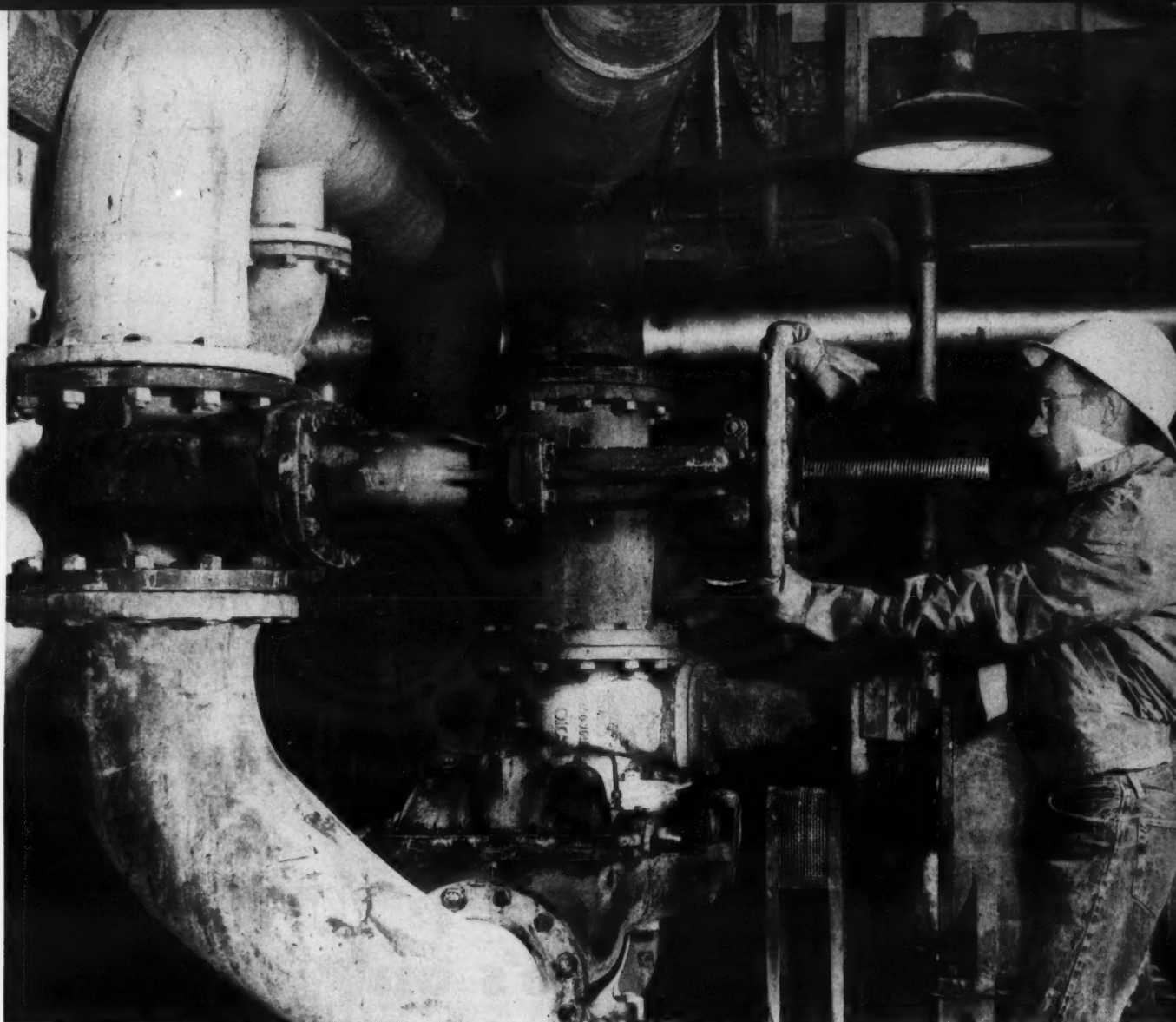
If several items from the same manufacturer are listed in the story just write the item down in the space provided on the Reader Service slip. Don't forget to include the key number.

Then fill out the slip and mail it to Reader Service Department. We will contact the manufacturer for you.

Additional details will be sent direct to you.

Be sure . . .

to fill in the slip with the other pertinent information: your name, title, company, product made, and address.



This 4000 gpm Stainless Steel pump has circulated acidic water for four years. It has needed no maintenance.

Stainless Steel equipment cuts replacement costs 75%

AT INTERMOUNTAIN CHEMICAL COMPANY, WESTVACO, WYOMING

operated by WESTVACO CHLOR-ALKALI DIVISION, FOOD MACHINERY & CHEMICAL CORP., NEW YORK

"Hot alkaline crystal slurry ruined our 10,000 gpm pumps after only two years of service," says Mr. Reinert Kvidahl, Operating Superintendent at Intermountain's soda ash plant. "These pumps corroded and leaked. We replaced them with Stainless Steel pumps three years ago, and today they're still in excellent condition. They show no wear at all and no corrosion.

"We also had a 4000 gpm pump that moved acidic water. It needed major repairs in only six months. We replaced it with a Stainless Steel pump that has been in service for four years now and has never needed maintenance.

"Carbon dioxide and other acidic vapors corroded our barometric con-

densers. We replaced them with Stainless Steel condensers and we've had no more trouble.

"There are many such cases all through this plant. Wherever we had corrosion maintenance problems, we have replaced equipment with Stainless Steel—in pipes, valves, flex joints, filter leaves, linings, even nails and bolts. Because the Stainless resists corrosion and lasts years longer, we've saved more than 75% in replacement costs in spite of the higher initial cost of the Stainless."

End corrosion losses and frequent replacements in *your* plant. Replace with Stainless Steel. And specify USS Stainless Steel for service-tested quality.

USS is a registered trademark



United States Steel Corporation—Pittsburgh
American Steel & Wire—Cleveland
National Tube—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel



Thousands of pressure vessels like these have been produced for the A.E.C. by Newport News, ahead of contract delivery schedule. Nickel-plated inside and out, they withstand corrosive uranium-hexafluoride gas.

When the pressure's on for pressure vessels

Specialized production techniques and the skill of Newport News craftsmen operating vast fabricating shops team up to deliver trainloads of pressure vessels on schedule.

When it comes to turning out process equipment, Newport News has the facilities and experience. So get a bid from Newport News on your present or future projects. Get the benefit of plant methods developed by specialists producing pressure vessels, vacuum tanks, towers, reactors, weldments and sub-assemblies.

Look over the scores of ways in which Newport News can help you . . . send for the easy-to-read, illustrated booklet *Facilities and Products*. It's yours for the asking.

Engineers: Desirable positions available at Newport News for Designers and Engineers in many categories. Address inquiries to Employment Manager.

Newport News
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Newport News, Virginia

Check 2215 opposite last page

PETROCHEMICALS

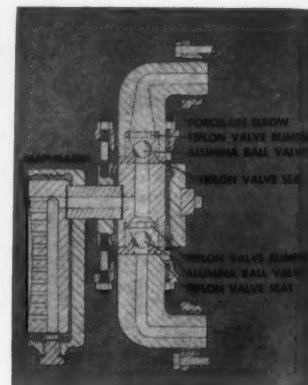
Porcelain reagent head equips metering pump for corrosives

Material does not absorb or contaminate

Uses: Mounting on metering pump to permit handling of corrosive liquids.

Features: Use of chemical-porcelain liquid-contact points permits handling of any acid except hydrofluoric at elevated temperatures and of most alkalis at moderate temperatures.

Description: Chemical-porcelain reagent head acts as transfer medium for corrosive fluids. Liquid is drawn into suction check valve of head



Chemical-porcelain head acts as transfer medium for corrosive fluids on control-volume diaphragm pump

and discharged out discharge check valve of controlled-volume diaphragm pump by hydraulically actuated diaphragm.

Porcelain is utilized for pumping head, connector, valves, valve housing, and inlet and outlet connections. These parts are reinforced with metal or Fiberglass armor. Teflon is used for diaphragm, valve seats, valve stops, and gaskets. Porcelain exhibits no absorption and freedom from porosity or contamination.

(Chemical-porcelain reagent head for Pulsafeeder metering pump is product of Process Equipment Division, Lapp Insulator Co., Inc., 104 Hall St., LeRoy, New York.)

Check 2216 opposite last page.

U.S.I. CHEMICAL NEWS

★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★

First Technical Book On Aerosols Published

For the first time, complete information on packaging products in pressurized containers has been set down in one place—a 411-page book by Herzka and Pickthall titled "Pressurized Packaging (Aerosols)," now being sold.

Chapters give detailed information on propellants, containers, valves, filling methods, laboratory procedures, emulsion systems and perfumes. Graphs, charts and photos illustrate all chapters, which are followed by lists of literature references and significant patents.

Formulations—over 200 in all—are included, on a wide range of products from insecticides and paints to cosmetics, perfumes and foods. Appendices cover common abbreviations, technical terms, trademarks and trade-names, and aerosol producers throughout the world. The book is considered an extremely valuable reference for both research and development and management groups.

New U.S.I. Sales Office Opens in San Francisco

U.S.I. has established a San Francisco sales office, managed by Kenneth Fietz, who has been a representative of the company's New York Sales Division for the past 16 years. The new office, located at 220 Montgomery Street, was created to serve U.S.I. customers in central and northern California, Oregon and Washington. This office is tied in with U.S.I.'s automated communications system through



Pacific Coast headquarters in Los Angeles. This will facilitate the processing of orders and messages by the company's offices and plants in all parts of the country.

H³-Labeled Methionine Gives Clue to Protein Synthesis in Cells

In a recent study of protein synthesis in the cells of adult mice, DL-methionine labeled with tritium (H³) was injected into test animals and then traced by radioautography methods. Results revealed that the most active protein synthesis involving methionine takes place continuously and independently within the cytoplasm and nuclear chromatin. Very little protein is synthesized from methionine in the nucleolus.

In this particular study, tritium was used as the tracer element because its low β -ray energy allows good radioautographic resolution. Previous investigations with S³⁵-labeled methionine had shown only that this amino acid is continuously being incorporated into protein in all cells. However, the exact distribution of synthesis in the nucleus and cytoplasm could not be determined up to this time because the high β -ray energy of S³⁵ prevented good resolution.

U.S.I. Starts Up 75-Million-Lb. Polyethylene Plant at Houston

Low and Medium Density Resins Being Produced by High Pressure Process. Plans Already Underway to Double Capacity.

U.S.I.'s new high pressure polyethylene plant has just been put into operation at Houston, Texas, to make 75 million pounds per year of PETROTHENE® resins.

The Houston installation was rushed into production some six to eight weeks ahead of schedule when demand for PETROTHENE resins began to outrun supply late in 1958.

As a result of this demand, a major expansion is already being planned, to double the new plant's capacity and bring the company's PETROTHENE output in Houston to 150 million pounds of high pressure polyethylene per year. At Tuscola, Illinois, U.S.I. now turns out about 100 million pounds of polyethylene annually. Thus, when the planned expansion at Houston is completed late in 1960, total U.S.I. capacity will be 250 million pounds of high pressure resins per year. This will make the company the second largest polyethylene producer in the country.

The new plant is well situated on the Houston Ship Channel for shipment of resins by all means of transportation. Export shipments are facilitated by the extensive port facilities available in Houston. The new installation is assured of a plentiful supply of ethylene—the major raw material—from salt dome storage facilities.

MORE

Oils Solubilized in Alcohol By New Patented Technique

Drug and cosmetic manufacturers can now formulate water-clear, non-aqueous products containing both oils and low-molecular-weight alcohols, via a new solubilizing technique described in U.S. Patent No. 2,865,859 issued recently.

According to the patent, it has never been possible commercially to prepare cosmetic or industrial solutions containing these alcohols plus large quantities of oil. Layering has always taken place. The technique described makes miscibility possible by including low-molecular-weight aliphatic alcohol esters of high-molecular-weight fatty acids.

Mixtures of esters such as ethyl laurate, butyl myristate, amyl oleate, propyl linoleate or isopropyl palmitate are cited. The resulting solutions would contain 20-50% oil, 20-50% low alcohol and 5-20% ester. The oils may be of any class—animal, vegetable or mineral—and the alcohols preferably in the one to five carbon group, such as ethanol, methanol and isopropyl alcohol.

Suggested formulations are given for cosmetic compositions which are claimed highly stable over a wide temperature range for long periods, without separation. Examples include sun-screening compounds, hand lotions, hair preparations, soaps, colognes, antiperspirants and after-shave lotions.

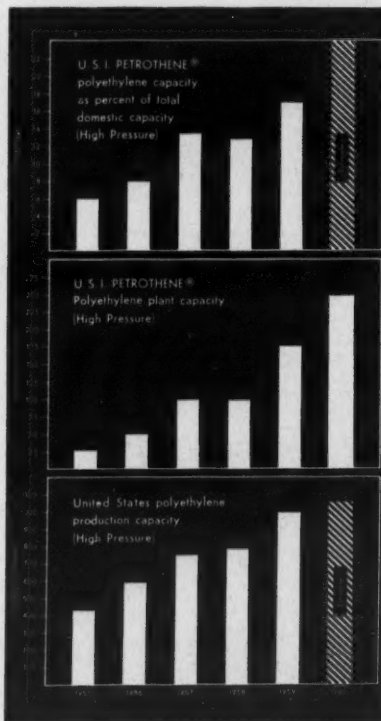
Other suggested fields of applications include metal working compounds, coatings, dry cleaning fluids, hydraulic fluids, biocides and lubricants.

NaK Basis of Prefab High-Temperature Test Loop

A high-temperature test loop, which uses NaK (sodium-potassium alloy) as the circulating medium, is now available as a package unit for research and study purposes.

The loop, designed for 1,000° F., can be employed to examine NaK's natural circulation characteristics, to study oxygen solubility in the alloy, to analyze flowmeter and pump performance, expansion treatment and piping arrangement, to investigate corrosion, mass transfer and metal stress, to design heat exchangers, and to develop pumps.

The unit consists of heaters and coolers, heat exchangers, EM pumps and flowmeters, cold trap, plugging indicators and instruments.



U.S.I. CHEMICAL NEWS

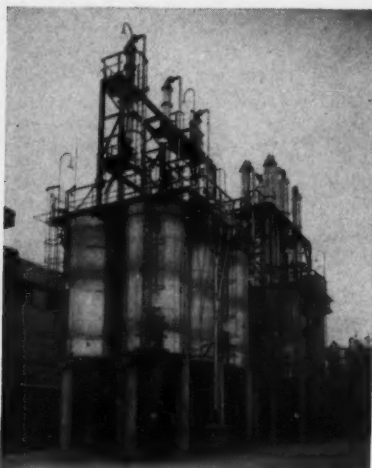
CONTINUED

Polyethylene

Other Resins Under Consideration

The company is now producing low density (.913—.924) and medium density (.925—.929) resins at the Houston unit. However, extensive research work has been done on the new high density polyethylenes and a process has been developed which is believed superior to any now used, both from a product quality and production cost standpoint. The process has not yet been commercialized due to the current market conditions on high density materials. U.S.I. is also studying polypropylenes and other polyolefins in pilot plant, and hopes to have more to say about them later in the year.

In less than four years U.S.I. has advanced from a nonproducer of polyethylene resins to its present position as third largest producer in the field. Commencing with an output of 26 million pounds in 1955, production increased to 50 million in 1956, 100 million in 1957, and now 175 million pounds. When the contemplated expansion at Houston is completed, the company will have realized a total increase in production capacity of some 900% since 1955.

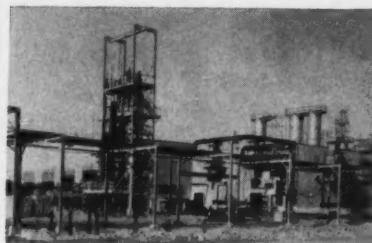


Product storage silos at U.S.I. polyethylene plant, Houston, Texas.

Film Grades a Specialty

Although U.S.I. makes a full line of resins for all applications, much of its growth in polyethylene has been based on special efforts to develop improved coating and film grade resins. Recently the company pioneered a technique for producing crystal-clear cast film. This material has excellent potential in the huge bread wrap field and other large-volume overwrap markets.

Tailor-making resins for specific purposes was originally and still is one of the distinguishing features of U.S.I. as a polyethylene producer. In all, the company markets some 70 resins today, each varying somewhat in melt index, density, strength, clarity, gloss, slip, stiffness and other properties.



Gas-producing area at Houston plant.

Two New Aerosol Formulas Contain Anhydrous Alcohol

Two new formulations—one for a white shoe polish, the other for a stocking-run stopper—have been developed by one chemical manufacturer for consideration by aerosol packagers.

The run-stopping spray consists of equal parts of anhydrous ethanol and a fast-drying adhesive, plus propellant, coloring and perfume. The formula is said to be nonflammable, and is considered stable, although stability tests have not been completed as yet. Recommended filling pressure and method of application are given.

The shoe polish spray—containing an ethanolic solution of PVP/VA, a sebacate, titanium dioxide, glycerine, isopropanol, acetone and propellant—is claimed to eliminate messy handling and to allow easy touch-up. Filling techniques, valve types and pressure are suggested.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

Radioactive crystalline C¹⁴-L-glutamine can now be obtained for *in vivo* studies of blood-brain barrier permeability and biological utilization of glutamine by brain and other organs. Specific activity of product is 27.8 μ /mg. **No. 1470**

New carbon-monoxide-poisoning test kit now on market determines extent of CO poisoning in a minute by testing exhaled air or in under five minutes by testing blood sample. Color change in treated silica gel indicates % CO in blood. **No. 1471**

Reactor fuel technology is covered in new, 120-page volume now being sold. Includes papers and discussion on economic fuel selection, blanket fuel systems, types of uranium systems, types of fuel elements, cladding and canning. **No. 1472**

Phosphorus pentasulfide safe-handling practices are described in 14-page safety data booklet which can now be purchased. Discusses hazards, protective equipment, containers, waste disposal, first aid, medical care. **No. 1473**

A circular, slide-rule-type of device, which predicts whether a chemical reaction is possible for 10,000 different chemical equations, is now available to chemists and chemistry students. Complete use instructions given. **No. 1474**

Refined ethylene of 99.5% minimum active-ingredient content is described in new data sheet now being offered. Data includes specifications, properties, shipping information, uses plus references on use as ripening agent. **No. 1475**

New analyzer, said to determine amounts of over 20 amino acids in a protein hydrolysate in only 22 hours, is described in new brochure. Results claimed consistent within 2-3%. Typical run shown. Specifications given. **No. 1476**

Cold caustic pulping of mixed hardwoods is detailed in technical report now offered. Includes complete process description, equipment data, flow sheet, quality control tests. Discusses results of studies on pulping variables. **No. 1477**

Niobium and its compounds are described in new book now being sold. Chapters cover sources, supply, economics, extraction, separation, metal preparation, impurities, properties, plating, alloys, reactions, nuclear uses. **No. 1478**

Over 125 radioactive measuring instruments are listed in new 76-page catalog. Detecting, counting and recording instruments are described. Included are systems for research, medicine and education. **No. 1479**

PRODUCTS OF U.S.I.

POLYETHYLENE RESINS

PETROTHENE® is the registered trademark for U.S.I.'s polyethylene resins. PETROTHENE resins are used in a wide variety of end uses such as film extrusion, pipe extrusion, extrusion coating, wire and cable coating, calendering, injection molding, blow molding, thermoforming and compression molding.

OTHER PRODUCTS

Heavy Chemicals: Anhydrous Ammonia, Ammonium Nitrate, Nitric Acid, Nitrogen Fertilizer Solutions, Phosphatic Fertilizer Solution, Sulfuric Acid, Caustic Soda, Chlorine, Metallic Sodium, Sodium Peroxide, Sodium Sulfite, Sodium Sulfate.

Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Urethan USP, Riboflavin USP, Intermediates.

Alcohols: Ethyl (pure and all specially denatured formulas); Anhydrous and Regular Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL® M, ANSOL® PR.

Organic Solvents and Intermediates: Normal Butyl Alcohol, Amyl Alcohol, Fusel Oil, Ethyl Acetate, Normal Butyl Acetate, Diethyl Carbonate, DIATOL®, Diethyl Oxalate, Ethyl Ether, Acetone, Acetoacetanilide, Acetoacet-Ortho-Chloranilide, Acetoacet-Ortho-Toluidide, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl Sodium Oxalacetate, Sodium Ethylate, ISOSEBACIC® Acid, Sebacic Acid, Urethan U.S.P. (Ethyl Carbamate), Riboflavin U.S.P.

Animal Feed Products: Antibiotic Feed Supplements, BHT Products (Antioxidant), Calcium Pantothenate, Choline Chloride, CURBAY B-G®, Special Liquid CURBAY, VACATONE®, Menadiol (Vitamin K₃), DL-Methionine, MOREA® Premix, Niacin USP, Riboflavin Products, Special Mixes, U.S.I. Pernodry, Vitamin B₁₂ Feed Supplements, Vitamin D₃, Vitamin E Products, Vitamin E and BHT Products.



INDUSTRIAL CHEMICALS CO.

Division of National Distillers and Chemical Corporation
99 Park Avenue, New York 16, N. Y.

U.S.I. SALES OFFICES

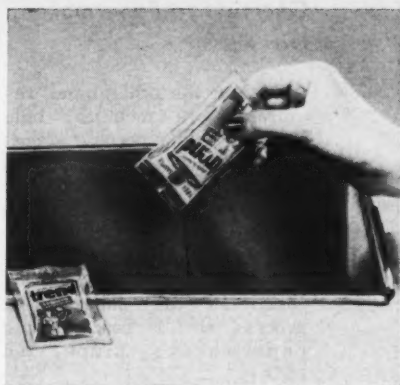
Atlanta • Baltimore • Boston • Buffalo • Chicago • Cincinnati
Cleveland • Detroit • Kansas City, Mo. • Los Angeles • Louisville
Minneapolis • New Orleans • New York • Philadelphia • St. Louis
San Francisco

From page 28

What's Ahead?

"As a matter of principle, as well as economic necessity, it appears that we must decentralize and delegate responsibility to all levels of management to an ever-increasing degree."

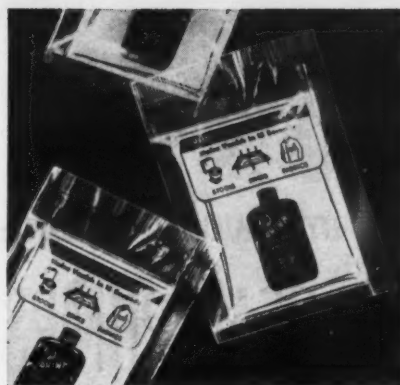
*In General Mills' breakdown of sales volume, the chemical and other non-food sales are reported together.



LIQUID DETERGENT is safely packaged in envelopes of "Scotchpak". Tests on polyethylene and other film laminates showed seam leakage. "Scotchpak" holds tight.



PASTE CLEANSER shelf life was extended 50% when this manufacturer switched from polyethylene to "Scotchpak" Heat-Sealable Polyester Film.



STRONG CHEMICALS—in liquid or dry form—can be packaged in "Scotchpak". Film resists puncturing and tearing, can be printed easily—no anchor coat needed.



SAMPLES of almost any inorganic or organic compound can be sealed in envelopes of "Scotchpak". Transparent packages are easy to handle, easy to ship and store.

Our Customer Service organization is ready to work with you—to show you how “Scotchpak” can solve your film fabrication and packaging problems. For complete information, write Film Products Group, Dept. TM-69, 3M Company, St. Paul 6, Minnesota.

... WHERE RESEARCH IS THE KEY TO TOMORROW



Check 2218 opposite last page

BUILD ON...

EASTERN

HYDRAULIC EXPERIENCE:

GEAR PUMPS and FLUID MOTORS

129 hydraulic pump and electric motor combinations are available off-the-shelf, for most applications. Outside this broad range, specific customer requirements can be met by drawing on Eastern's vast design resources.

All standard Eastern gear pumps are low in cost, light in weight, compact and reliable. Unique design features and very close tolerances enable each unit to achieve high volumetric efficiencies.

Check the performance ranges in these three major groups — do they meet your needs?

1200 series — up to 1.6 G.P.M. — pressures to 800 P.S.I.

100 series — up to 5 G.P.M. — pressures to 1500 P.S.I.

700 series — up to 9.8 G.P.M. — pressures to 1500 P.S.I.

In addition to these pumps, Eastern also produces a wide range of fluid motors, each capable of delivering a constant torque over a very wide speed range. They provide up to 14.5 ft. lbs. of torque at 1750 R.P.M. For full information on any one of these pumps, pump-and-motor combinations, or fluid motors, consult the Eastern sales engineer — or write for bulletin 810-S.

Eastern designs and builds



positive displacement pumps • gear pumps • centrifugal pumps

**EASTERN
INDUSTRIES
INCORPORATED**

100 SKIFF STREET
HAMDEN 14, CONN.



Chemists to Papermaker

From page 30

resins, on the other hand, requires more technical help since they have become almost as complex as the complexities of papermaking.

Sizing protects paper from the destructive action of water. Sizing materials most widely used are derived from rosin. In the papermaking process, size is reacted with papermaker's alum, $Al_2(SO_4)_3$.

Choice of the proper rosin and how it is refined and modified to make the size is vital to the paper manufacturer to insure that penetration of water into paper will be retarded.

Providing precise sizing specifications of a particular grade of paper is only one of many services a Hercules representative offers.

He is an authority on the use and application of a diverse group of chemicals. Among these is Paracol® wax emulsions developed in Her-

cules' laboratories for use to size and produce such properties as softness and finish.

Another is Aquapel® alkylketene dimers. This sizing agent reacts with cellulose fibers to form a surface that is resistant to penetration of both cold and hot water, acid, and alkali. Applied internally or as a surface size, it becomes an integral part of the paper. It is useful for paper being filled with $CaCO_3$ and also for coated papers with $CaCO_3$ included.

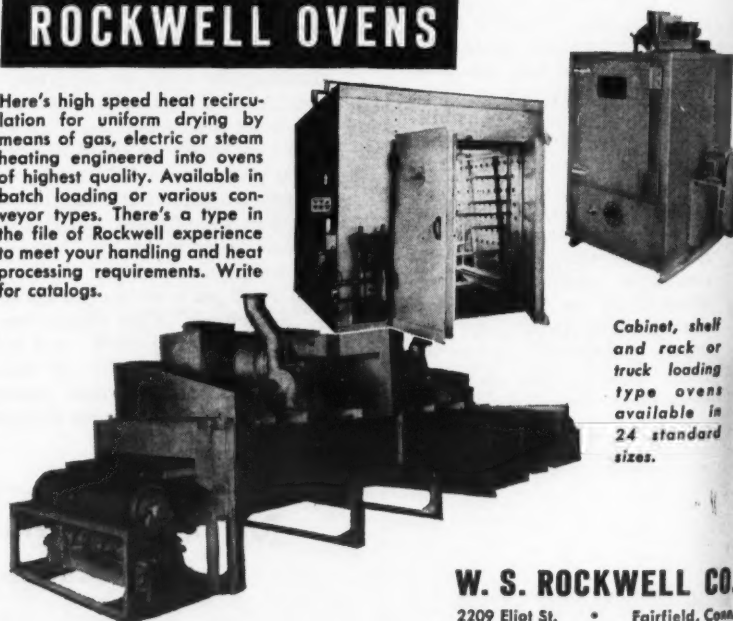
Still another is Kymene®, a series of wet-strength resins used to impart strength to papers designed to absorb water in normal use.

Foaming in the mixture of pulp and water fed to the paper machine is another problem often encountered by a representative. Keeping foam under control is somewhat of an art in itself. The solution to the problem calls for application of defoaming com-

for
the **MOST** IN DRYING BENEFITS
—Uniform Drying or Curing
—Economical Heating
—Economical Handling

ROCKWELL OVENS

Here's high speed heat recirculation for uniform drying by means of gas, electric or steam heating engineered into ovens of highest quality. Available in batch loading or various conveyor types. There's a type in the file of Rockwell experience to meet your handling and heat processing requirements. Write for catalogs.



Cabinet, shelf and rack or truck loading type ovens available in 24 standard sizes.

W. S. ROCKWELL CO.

2209 Eliot St. • Fairfield, Conn.

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CHEMICAL PROCESSING

pounds adapted to specific conditions in a particular mill.

Thus the representative, by taking over and planning details for the use and application of these and other chemicals, can relieve mill personnel from much work. At the same time, he provides a specialized service which gives his products better attention than the mill could afford to provide.

Laboratory Staffs

Behind the representative as he makes his rounds stands highly trained laboratory staffs at Hercules' research center in Wilmington, Del., and service laboratories at Kalamazoo, Mich., Holyoke, Mass., and Portland, Ore.

These laboratories, between them, have facilities not generally available to the average papermaker, and some facilities available for special work which few paper mill

groups could justify buying for their own use.

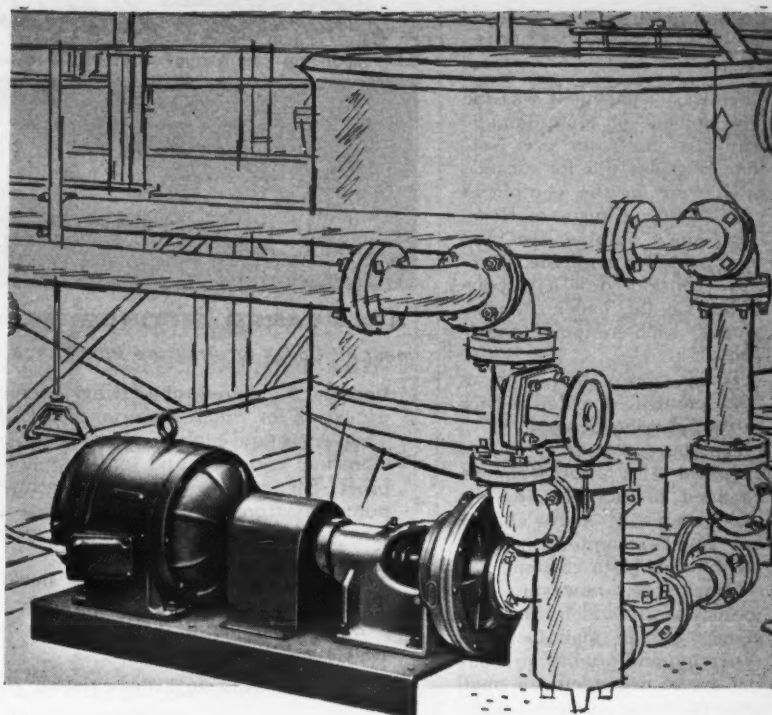
These include infrared and ultra violet ray equipment, electron microscopes, and mass spectrometers among other things.

When problems arise which might be solved by the help of this equipment, or the knowledge of the people who operate it, the facilities are available for immediate use.

Further backing up the representative is the combined experience of nearly 100 other technical sales and service employees in various parts of the country, as well as production facilities of eight plants strategically located throughout the United States.

District offices, out of which these service representatives work, are in Atlanta, Holyoke, Kalamazoo, Milwaukee, New Orleans, Portland (Ore.), San Francisco, and Wilmington.

An example of the service offered by the Paper Makers



Corrosion Can't K. O. This Centrifugal Pump!

It's an AMPCO — and it's engineered to combat velocity erosion and corrosion

*More than
108 different
combinations*

*Speeds,
1750 to 3500 rpm.*

*Capacities
to 600 gpm.*

Heads to 300 feet

Impellers and fittings are made from aluminum bronze or other workable alloys that resist the action of corrosive, abrasive media — instead of from commercial, tin-lead bronzes.

Impellers and volute shapes are designed to reduce internal turbulence and liquid-metal boundary velocities.

When process conditions change, you can alter your Ampco Pump to satisfy new requirements, easily and inexpensively. Ampco application engineers can suggest more than 108 pump combinations possible by interchanging stock components. A distributor near you has Ampco Centrifugal Pumps *in stock* — at no premium price. Write us for his name.

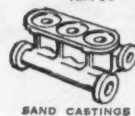
AMPCO METAL, INC.

Dept. 139F, Milwaukee, Wis. • West Coast Plant: Burbank, Calif.



THE METAL WITHOUT AN EQUAL

AMPCO — ONE-SOURCE SERVICE FROM RAW MATERIAL TO FINISHED PRODUCT



SAND CASTINGS



CAST FLANGES



FORGINGS



CENTRIFUGAL CASTINGS



EXTRUSIONS



CAST PIPE FITTINGS



FABRICATIONS



SHEET AND PLATE



MACHINED PARTS

P-20



Wire Mesh Products

Cut engineering and production costs with Jelliff's facilities for precision-forming special filters and strainers in any quantity.

THE C. O.

JELLIFF

MANUFACTURING CORPORATION

SOUTHPORT, CONNECTICUT

SERVING INDUSTRY
FOR 78 YEARS



Check 2221 opposite last page

Check 2222 opposite last page

Papermakers

From preceding page

Chemical Department was the development of an automatic emulsifier for rosin size. Neither Hercules nor its subsidiaries were in the equipment manufacturing business. However, since nothing else was commercially available, Hercules considered it a responsibility to the paper industry to make such equipment available.

Today, more than 100 of these emulsifiers are in service throughout the country.

Linking customer service to chemical sales is not, of course, confined to Hercules, or the paper industry. Many chemical suppliers extend similar technical help to customers.

There are, however, few industries in which the efficiency of the manufacturing operation and quality of product are so dependent on small percentages of chemical additives, such as where these materials are added and how, as they are in papermaking.

It was because of this that the early developers of the Paper Makers Chemical Department adopted the philosophy of making specialized chemical service a vital part of their contacts with customers.

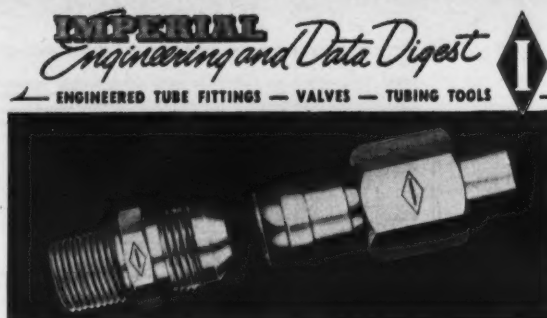
Aromatics

From page 29

This must eventually price us out of the world market where smaller nations have met the problem face-to-face and taken such measures as free currency convertibility, to name one, to put them into a more sound economic structure. The chemical industry is not unique in its problem.

Recently an English corporation underbid American corporations by \$6 million on the manufacture of a generator installation for the TVA. Note the influx of foreign automobiles which last year accounted for 8 percent of the U.S. automobile market.

It would seem to me that we had better become citizens who look beyond our own



37° FLARED FITTINGS BY IMPERIAL
meet all Codes for Pressure Piping including A.S.M.E.

Imperial 37° flared tube fittings offer all the quality extras for which Imperial fittings are famous. They withstand high pressures and temperatures, vibration, corrosion and tensile pull — stay leak-proof. Steam tracer lines, process lines, turbines, pumps, compressors, blowers — just a few of the jobs Imperial J.I.C. 37° flared fittings find in chemical plants.

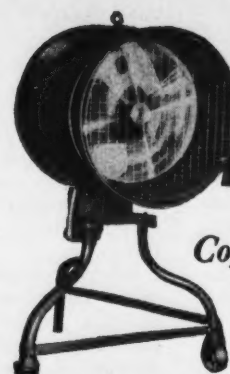
Provided in steel, stainless steel and brass. Thread protectors on all pipe ends.

Specify Imperial — the first name in fluid transmission components!

Send for Bulletin No. 3077

IMPERIAL THE IMPERIAL BRASS MFG. CO.
Dept. CPR-69
6300 W. Howard St., Chicago 48, Ill.
In Canada: 18 Hook Ave., Toronto, Ont.

Check 2223 opposite last page

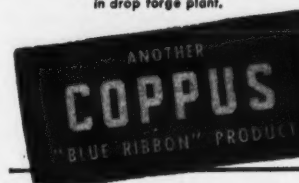


For Man-Cooling!

Coppus Airplane Type Heat Killer®
cools large areas — restores efficiency



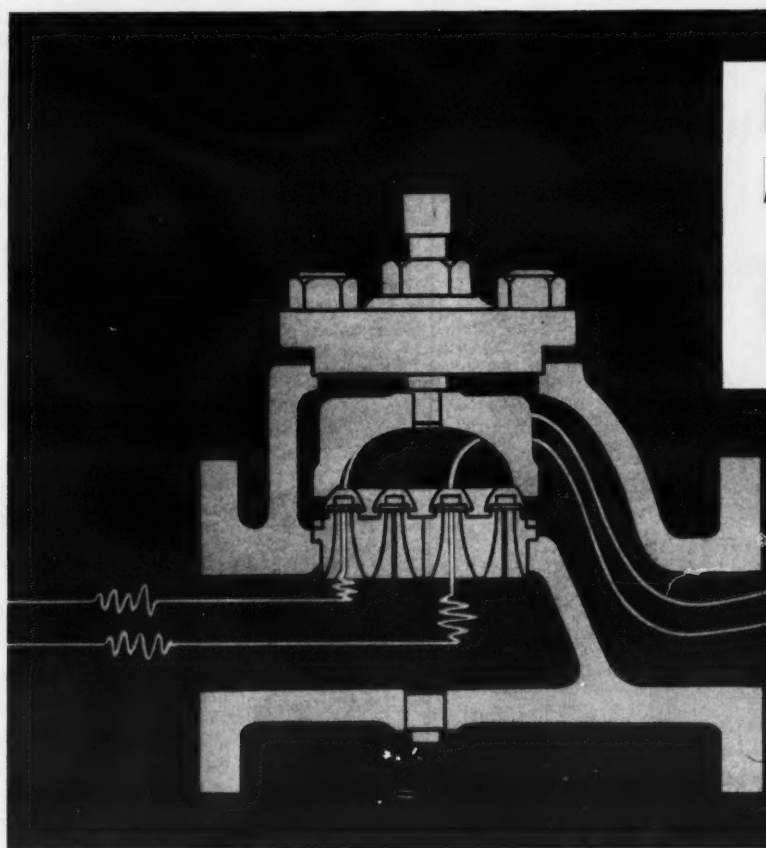
HEAT KILLER on the job in drop forge plant.



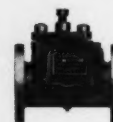
Steel mills, drop forge plants, foundries and other plants with hot working conditions find this Coppus Heat Killer increases worker efficiency . . . at reasonable cost. A single fan cools large areas.

Other types also available for cooling furnaces, electrical equipment, for driving out gases, drying out products, drawing out fumes. Write now for detailed information. COPPUS ENGINEERING CORPORATION, 386 PARK AVENUE, WORCESTER 2, MASSACHUSETTS.

Check 2224 opposite last page



PENNSYLVANIA AIRCHEK VALVES

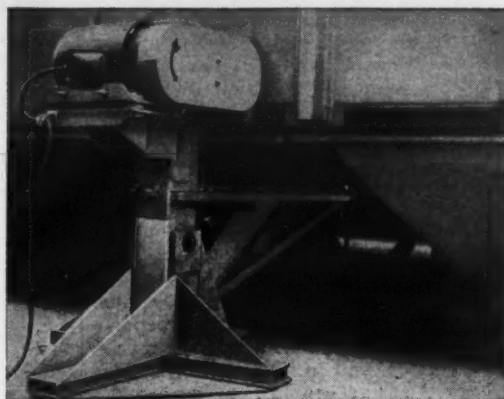


reduce air pulsations, noise and vibration in discharge lines.

NOW SHAKE COVERED HOPPER CARS

**Get more
IN**

Use the
National 81 covered
hopper car
shaker to compact
material during
loading operation—get
more payload.



Pat. Pend.

low cost
trouble-free
one man operation

**Get more
OUT**

Use the
National 81 covered
hopper car
shaker to vibrate bulk
materials out of
cars — quickly,
easily, safely.

NATIONAL CONVEYOR & SUPPLY CO.
357 N. Harding Ave., Chicago 24, Illinois

Check 2225 opposite last page

Airchek cuts vibration, annoying tank ring and air hammer

Now, pulsations can be virtually eliminated at low cost with Pennsylvania Airchek Valves. With the installation of an Airchek Valve in your air or gas discharge lines, pulsations are dampened. Down-time caused by vibrating, leaking discharge pipes is reduced.

Operation of the Airchek Valve is completely automatic. You install and forget it. Unlike ordinary check valves the Airchek will not chatter; will literally last for years. The Air Cushion Valve, an integral part of every Airchek Valve, is the same valve that is used in the thousands of Pennsylvania Compressors now in service. It is constructed without nuts, bolts or screws. Valve discs lift against a cushion of air, have no bending or flexing strains to weaken or distort them.

Our folder "Compressor noise and vibration give you a headache?" describes the Airchek Valve in detail . . . tells how you can have quieter, more efficient air lines. Write for your free copy today.

Our folder "Compressor noise and vibration give you a headache?" describes the Airchek Valve in detail . . . tells how you can have quieter, more efficient air lines. Write for your free copy today.

PENNSYLVANIA PUMP AND COMPRESSOR CO. Easton, Pa. Earning customer confidence since 1920.

- ☐ Please send me a copy of your folder "Compressor noise and vibration give you a headache?"
- ☐ Please have a representative call and give me full details on the Airchek Valve.

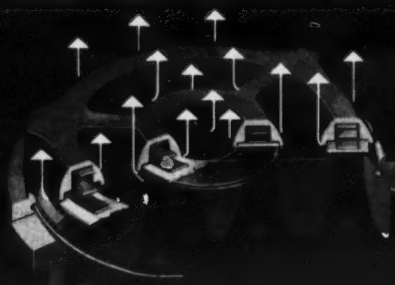
Name

Title

Company

Address

City Zone State



Arrows indicate flow of air through Air Cushion Valve, the heart of the Airchek Valve. Discs lift against a cushion of air . . . are noiseless in operation.

Check 2226 opposite last page

noses. Let us correct our own short-comings and let's start by overcoming the public apathy to partake in the voicing of opinions which makes the government "By the People." We have three alternatives:

1. Balance the budget.
2. Raise taxes.
3. Economic collapse.

**'If Your Ox Is Gored,
Holler Like We Do'**

WM. B. PLUMMER
Consultant
New York City

I agree heartily with his (O. V. Tracy's) statements and conclusions, and would merely like to add an "episodic item."

In June 1955 this import situation had not been publicized but was well known to U. S. benzene producers. I took occasion to chide a leading SOCMA (Synthetic Organic Chemical Manufacturers Association) member — and benzene importer — with their inconsistent and "water-on-both-shoulders" attitude. His reply was, "When our ox is gored, we holler. If yours is, why don't you?"

His advice — actually it was merely a sarcastic comment — is still valid.

New Product Development

From page 31

mation, we receive regularly copies of research reports from our 12 operating departments and the three auxiliary departments which conduct research—Central Research, Employee Relations, and Engineers. We also arrange to receive copies of any departmental reports which may give us a clue as to current and long-range interests of the departments.

We are constantly tracking

Is Filtration Your Problem?



THIS FILTRATION
ENGINEERING
MANUAL IS
YOURS FOR
THE ASKING

Let this NEW CATALOG help you

FIGURE the filter area and capacity required for your process and the size of filter press needed.

DETERMINE COST of the filter press based on its size and required materials of construction.

SELECT the filter press design and type best suited to your needs.

Is the fluid
Corrosive
Abrasive
Viscous
Delicate
Thick

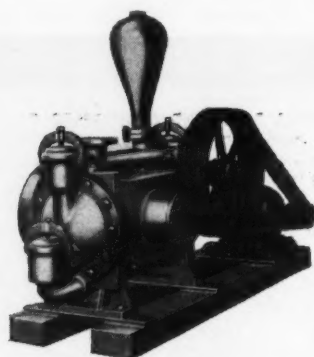
then you need
a **SHRIVER
DIAPHRAGM
PUMP**

T. SHRIVER & COMPANY, INC.

846 HAMILTON STREET • HARRISON, N. J.

SALES REPRESENTATIVES IN: Chicago, Ill.—Atlanta, Ga.—Houston, Tex.—Detroit, Mich.
St. Louis, Mo.—San Francisco, Cal.—Montreal, Que.—Toronto, Ont.

FILTER PRESSES • VERTICAL LEAF FILTERS • FILTER MEDIA
HORIZONTAL PLATE FILTERS • CONTINUOUS THICKENERS
SLAB FORMERS • DIAPHRAGM PUMPS • ELECTROLYTIC CELLS



Here's the time-tested positive displacement pump that cuts operating and maintenance costs in handling materials that quickly wear out ordinary pumps. It's a double-acting piston pump without packings; no leakage; easy to clean and service; low power cost; capable of discharge pressures to 100 psi. Bulletin 137A gives the facts.

New Product Development

From preceding page

down bits of information that may come to us and which we feel may lead us to some useful information. This helps us pursue information about new chemicals outside the company, and aids us in keeping abreast of new developments within Du Pont.

The research man often has a multiple choice of raw materials when working out a new process. A very important part of our job is to help him narrow his choice as quickly as possible so as to eliminate wasteful expenditures of manhours and money, and to help him bring his investigation to successful fruition. This of course helps Du Pont maintain its competitive position.

Early and accurate information about new materials helps our technical people make long-range plans. Groups to which our program is directed are primarily research, manufacturing, and sales technical people for each of the 12 operating departments, and research people of the three auxiliary departments already mentioned. (Du Pont has 12 auxiliary departments.)

Area of Work

The area in which we work covers the period between the time the supplier is willing to talk about his new chemical and the time he is ready to sell. Before getting seriously interested in this new material, we assume these things:

1. The patent position is established.
2. Reaction data are available.
3. Toxicity data are available.
4. Samples are available.

While we like to have an idea of the development price, we particularly want the projected commercial price. This is essential in long-range planning. We assure ourselves of long-range supply, and study market possibilities for co-products or by-products, if either is a factor.

When all this information is in hand—or enough to justify stirring up interest within Du Pont—it is summarized



■ Product preparation is the strongest single influence on your weekly sales, monthly volume and annual profit. If ordinary screens are giving you ordinary product quality, find out how Bee-Zee Screens are the difference between problems and profit.

Bee-Zee Screens make you money through sharper sizing, better dewatering or deliquifying, non-clogging action and resistance to abrasion. They are stainless steel, precision welded to form the right size, right shape and right dimension screen for your operation and equipment.

Talk to your screening equipment manufacturer about Bee-Zee Screens. Or, write, wire or phone Dickens 2-5154 collect.

ROUND-ROD SCREEN
long-life accuracy

GRIZZLY ROD SCREEN
rugged accuracy

ISO-ROD SCREEN
prolonged accuracy

TRI-ROD SCREEN
knife-like accuracy

GRIZZLY ROD WITH SKID ROD
ruggedest accuracy

**BIXBY-ZIMMER
ENGINEERING COMPANY**

769 Abingdon Street, Galesburg, Illinois

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CHEMICAL PROCESSING

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in a New Product Report which is distributed to approximately 300 key individuals—research directors, laboratory directors, development managers, plant technical people, and a miscellaneous group. Also receiving reports are nearly 40 literature repositories, chiefly libraries.

Reports also are sent to the Purchasing Department, for it may be able to offer information on the supply situation that is of critical interest.

Seminars, Symposia

When there is sufficient interest in a product that may be of major import to Du Pont, the Development Department sets up a seminar or symposium to facilitate a complete review for Du Pont research personnel.

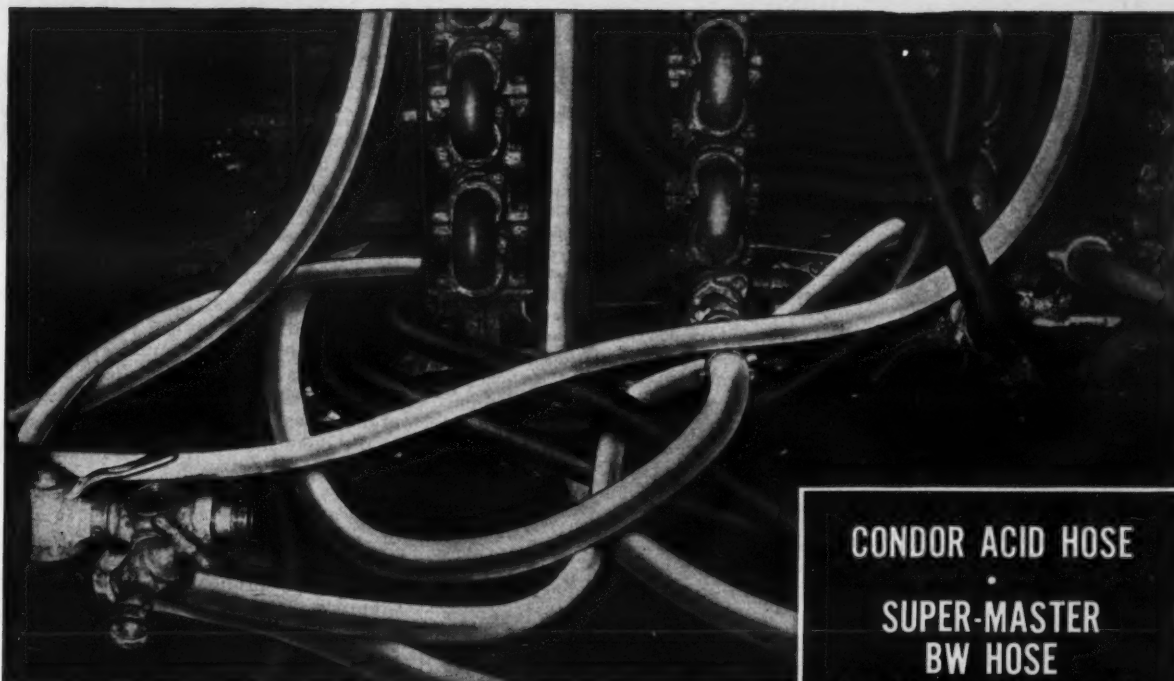
Quite often the proceedings of a symposium are summarized and broadcast to the entire New Product Report list when it is felt that such a summary would be of interest and value to more than the audience for whom the symposium was designed.

The small supplier is sometimes an excellent source of development materials for the chemical processing industry. Some time ago a manufacturer of specialty chemicals came to us with information about a new method of fractionating lignin materials. He wanted to market these chemicals. The necessary data were summarized and distributed in a New Product Report. Result: sales of that company's products to several Du Pont operating departments.

Dacron Sped to Market

In making Dacron polyester fiber, we use paraxylene, a petroleum fraction. When it became apparent this raw material was the key to getting into full-scale production of our new fiber, some units of the petroleum industry undertook to separate the para compound from the xylene stream. Their success in doing so greatly facilitated the task of getting Dacron to market.

Believing that first impres-



R/M HOSE

Engineered for Chemical Processing

Engineered features of Raybestos-Manhattan hose for the chemical industry increase hose service life for every job requirement. Condor Acid Hose, for example, can handle practically all inorganic acids and salts up to 150° F. It is available with special tubes of rubber, neoprene, Butyl or Hypalon to withstand a wide variety of active chemicals. Super-Master BW Hose with woven wire reinforcement is practically burst-proof, ideal for handling steam, air and water under high pressures. R/M Teflon* Lined Hose assures complete resistance to most active corrosive and contaminating solutions, prevents caking of hose lines. Raybestos-Manhattan also manufactures special types of oil-proof hose for petro-chemical processing.

For general service at the chemical plant, Allflex is light, strong, and flexible as a rope . . . the easiest handling all-purpose hose made for use with air, water, oil and gases—even mild chemicals.

Where corrosion, wear, or expansion are problems with metal pipe, use Condor Flexible Rubber Pipe that outlasts iron or steel. R/M Rubber Expansion Joints are engineered to prevent stresses of expansion, misalignment, and insulate vibration.

For every application in the chemical industry, there's an R/M hose or Condor Flexible Rubber Pipe to do a better job, longer . . . give you "More Use per Dollar." Discuss your requirements with an R/M representative.

CONDOR ACID HOSE

SUPER-MASTER
BW HOSE

for Steam, Water, Air

R/M TEFLON* LINED
HOSE

ALLFLEX
ALL PURPOSE HOSE

PARANITE
OIL-PROOF HOSE

CONDOR FLEXIBLE
RUBBER PIPE

R/M EXPANSION
JOINTS

"More Use per Dollar"

• WRITE FOR BULLETINS

*Teflon—A Dupont trademark

RM-908

BELTS • HOSE • ROLL COVERINGS • TANK LININGS • INDUSTRIAL RUBBER SPECIALTIES
MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY
RAYBESTOS-MANHATTAN, INC.

Other R/M products: Abrasive and Diamond Wheels • Brake Blocks and Linings • Clutch Facings • Asbestos Textiles • Mechanical Packings • Engineered Plastics • Sintered Metal Products • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls



Check 2229 opposite last page

Johns-Manville Products Corporation

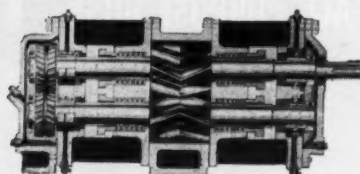
Pumps 230 gpm. of Asphalt at 460°F.

with Sier-Bath GEAREX® PUMP

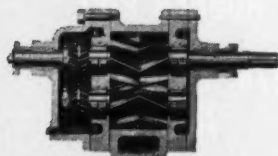
• This Sier-Bath Gearex Rotary Pump, external gear and bearing type, has been providing rugged service since 1956 at the Johns-Manville Building Products Division Plant, Fort Worth, Texas. Operating on 24 hour schedules, 5 days a week—often 7 days a week—the Gearex Pump handles 230 gpm. of Asphalt at 460°F. with viscosity from 160 to 7,000 SSU, at pressures from 60 to 100 psig. The pulseless discharge of the rotary design has proved especially valuable at this installation. All gears and bearings are externally mounted, never in contact with the hot asphalt.



Sier-Bath "Gearex" Pumps



EXTERNAL GEAR & BEARING TYPE
for non-lubricating liquids



INTERNAL GEAR & BEARING TYPE
for lubricating liquids

Sier-Bath "Gearex" Pumps provide positive displacement, pulseless flow . . . quiet, vibrationless operation. Direct-connected up to 1800 RPM, they require no reduction gears. For high volumetric efficiency and long life there is no rotor-to-rotor or rotor-to-casing contact. Low pressure on stuffing boxes provides easy servicing.

Horizontal or vertical models to handle 32 to 500,000 SSU, 1 to 550 GPM at 250 PSI for viscous liquids, 50 PSI for water. Corrosion-resistant alloys, steam-jacketed bodies, water-cooled bearings, other adaptations to meet individual needs. See "Yellow Pages" for your local Sier-Bath Pump Representative or send for Bulletin G-2. Sier-Bath Gear & Pump Co., Inc., 7260 Hudson Blvd., North Bergen, N. J.

Sier-Bath ROTARY PUMPS



Screw Pumps

Gearex® Pumps

Hydrex® Pumps

Founded 1905

Mfrs. of Precision Gears, Rotary Pumps, Flexible Gear Couplings

Member A. G. M. A.

Check 2230 opposite last page

New Product Development

From preceding page

sions are singularly important, we present information about a new chemical concisely, and in a manner calculated to make it as attractive as possible to the reader, frankly pointing for his interest.

A new chemical often has to be "sold" to technical people, and the development man simply sets out to "sell." Research and operating people aren't always ready to jump at the mere hint of a fascinating new material.

This is understandable. They are busy exploring other new chemicals that look equally attractive as the new one that is brought to their attention. And it is not always apparent at first glance that a certain product could hold promise for Du Pont's long-range plans.

One feature that has been very helpful is the card file which has been kept of every supplier contact since inception of this service. On each individual's card is noted all the information needed for current or future reference.

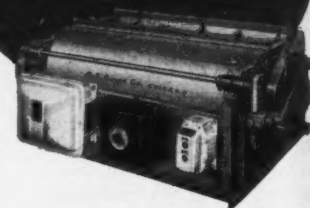
Constant revision of the circulation list is a "must." Individuals are promoted and assume new jobs, thus making any circulation list only good on a given date. This type of revision is only possible from inside the organization.

We find that attention to details such as this is what makes a workable program of something that could very well "get lost" in spite of the care with which the knowledge is gathered.

NEXT MONTH

The new and enlarged St. Lawrence Seaway is now open. Through it are passing ships which fly the flags of many nations. What effect—what impact—will this new dimension in transportation have on North America? Intriguing viewpoints are contained in an exclusive report compiled through the help of federal government, civic, and city leaders.

Here's the way
to regulate bulk feeding



DRAVER FEEDERS

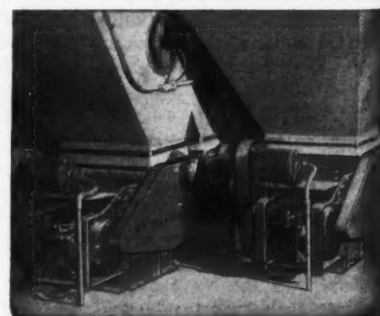
with or without automatic timing controls

Here's the way to keep production units—grinders, sifters, mixers, etc.—operating steadily at most efficient capacity. A Draver capacity regulating Feeder assures a continuous, uniform flow of material to the machine . . . prevents dangerous overloading and wasteful underloading . . . helps maintain quality control . . . repays its cost many times over in a smoother running production system.

Even sticky, hard-to-handle materials can be accurately regulated by dependable Draver Feeders—at rates from ounces to thousands of pounds an hour. Timing controls are available for feeding preset amounts at automatic intervals to continuous or batch processes.

What is *your* bulk feeding problem? Send details, and our engineers will be glad to make recommendations on a Draver Feeder that will save you production time and money. No obligation, of course.

Draver "Micro-Master" Feeders, mounted at floor level, feed to mixing equipment below.



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EQUIPMENT FOR THE PROCESS INDUSTRIES

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Check 2231 opposite last page

CHEMICAL PROCESSING

The art of soapmaking has come a long way since the days of the ancient Phoenicians. Marking another milestone in the field . . .

Continuous process makes soap 200 times faster

Although the kettle has occupied a position of prime importance in soapmaking since the ancient beginning of the art, the development of a new continuous process may soon make its use obsolete. Completely automatic, the compact, streamlined process produces soap about 200 times faster than the conventional batch method. Saponification reaches 99.95% in less than 20 minutes. Space requirements for the process are small. A 900 sq ft plant is reported to be able to turn out five tons toilet soap per hour.

The process is extremely flexible. All types of soap, including laundry and industrial soaps as well as high grade toilet soaps can be produced. To prevent product oxidation during processing, all operations are carried out under hermetic conditions. Change-over from one soap to another can be quickly made. Operating costs for the process are low. Heating expenses are said to be only approximately 1/10 of those for the kettle method.

At present there are no U. S. installations. A full

scale plant however, is operating at the Barnängen Company, Stockholm, Sweden.

Process Has Three Stages

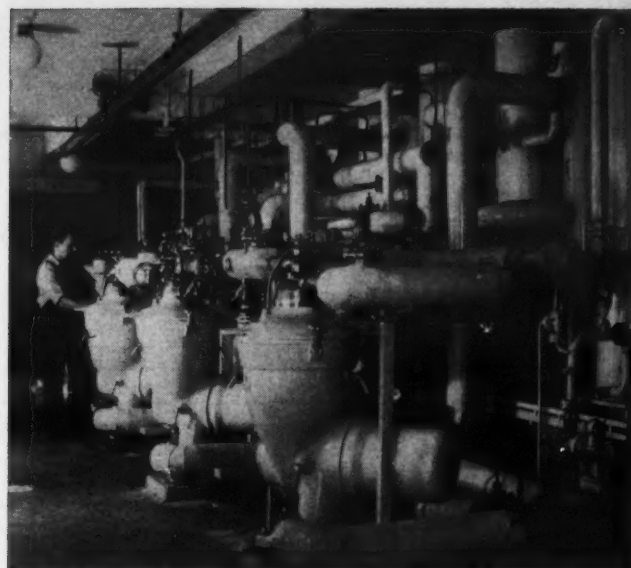
The process consists of a completely automatic system controlled from one centrally-

located instrument panel. Production of soap is carried out in three stages: 1) Saponification of the neutral fatty oils with lye, 2) Washing of the soap mass with brine (to recover glycerine released in process), and 3) Fitting of the soap in order to effect

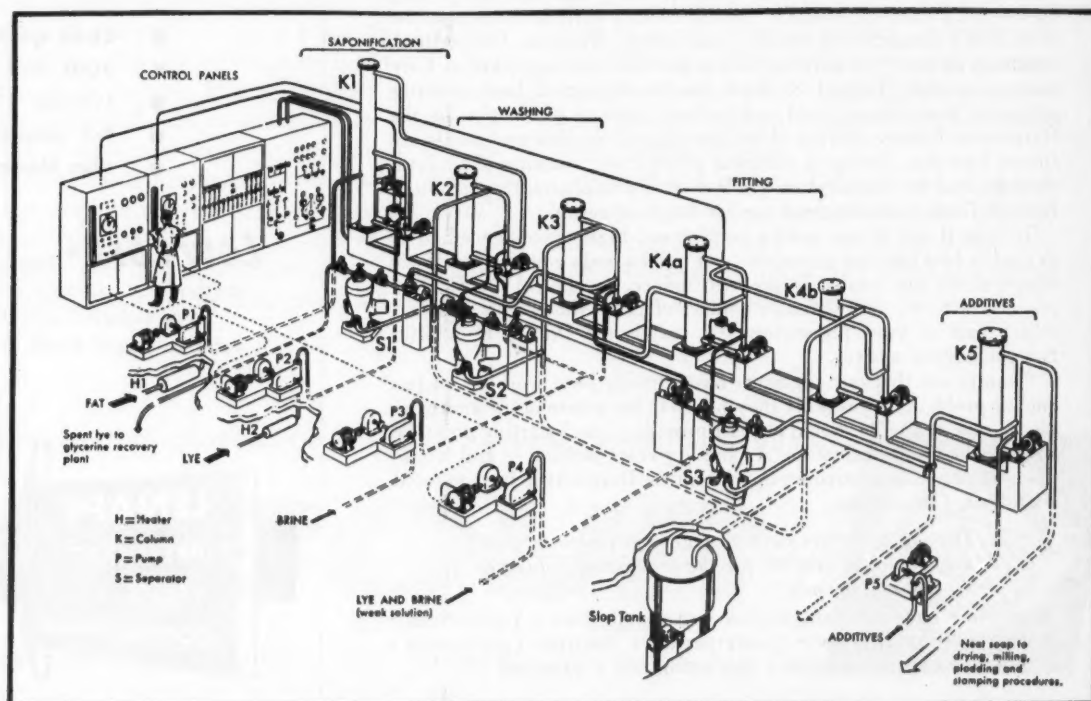
further purification. Over-all process is illustrated in flow diagram accompanying this article.

The raw fatty material and caustic soda solution enter the saponification reactor K1 by means of pumps P1 and P2.

To page 97



Centrifuges used throughout process are of the hermetic type, designed to keep air out of the system

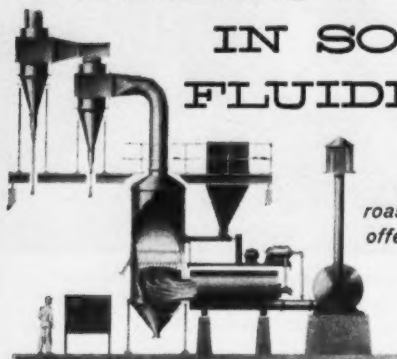


Continuous soapmaking process is fully automatic, can turn out variety of soaps

DORR-OLIVER POINTERS

A SERVICE TO THE PROCESSING INDUSTRIES

WHAT'S NEXT IN SOLIDS FLUIDIZATION?



A versatile drying, roasting and calcining technique offers opportunities in chemical processing. Here's a report on developments.

Since Dorr-Oliver first introduced the fluidization technique for non-catalytic applications more than ten years ago, our engineers have been constantly investigating its wide potentialities. From such well established operations as the roasting of sulphide ores, SO₂ production for acid manufacture, drying of fine coal and drying and sizing of lime stone, development is now extending into many fields of chemical processing.

The advantages of FluoSolids®, Dorr-Oliver's system for fluidized bed techniques, are its essential simplicity, its compactness, its low operating and maintenance costs, its ability to take wide feed variations and its inherent adaptability to precise temperature control with simple instrumentation. It has proved particularly effective in drying wet, sticky or otherwise difficult-to-handle materials. In some drying operations, the added benefit of classification by particle size is possible.

At D-O's research and development center, Westport, Connecticut, hundreds of test runs covering many possible new applications have been completed. Typical of these are the drying of heat sensitive polymers, hydrochloric acid and sodium sulphate production by the Hargreaves Process, drying of sodium chlorate crystals and potassium silicon fluorides, drying of chemical precipitates, roasting of furfural residues, and low temperature calcination of phosphates. Opportunities for still further development are far from exhausted.

To sum it up: if you want a continuous, high capacity method of drying or heat treating materials . . . if precise and completely uniform temperatures are needed to prevent, induce, or control chemical or physical action . . . if intimate contact of gases with solids is a necessary part of your processing . . . maybe the Dorrco FluoSolids System is your answer.

Chances are that our engineers have already been working on just such a problem as yours. If they haven't, the information and experience now available should at least provide a good starting point for investigation and evaluation. An inquiry costs nothing — and it may open up mutually rewarding opportunities. Dorr-Oliver Incorporated, Stamford, Connecticut.

Dorr-Oliver offers a wide range of equipment, methods and complete systems for the processing industries. Operations include:

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CENTRIFUGATION • ION EXCHANGE • PUMPING

Check 2232 opposite last page

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See our standard line of pressure vessel connections on pages 1128-1129 in the 1958 Chemical Engineering Catalog.

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Check 2233 opposite last page

CHEMICAL PROCESSING

Soapmaking Process

From page 95

The fat is introduced into the middle section of column and mixed with the soap already present. Passage through this part of column takes only about two minutes. When leaving top of column soap is actually 99.95% saponified.

Saponified product then flows to washing section where it is washed counter-currently by an aqueous electrolyte solution. Brine containing 12-14% NaCl is most commonly used. The soap is mixed with the solution in each of the three washing steps, K2, K3, and K4. Phases are formed in each step. These are separated after each wash by centrifuges S1, S2, and S3. Amount of brine necessary for washing is set by adjusting variable-speed proportioning pump, P3.

Centrifuges used throughout process are of the hermetic-type, specially designed to keep air out of process. Separation efficiency can be automatically controlled during operation.

Glycerine Recovery

Glycerine, water-soluble color pigments, and other impurities are removed during the washing operation. Assuming recoverable glycerine content of initial fatty charge amounts to 10% and that some 40-45 parts of spent lye are used for every 100 parts of washed soap, glycerine concentration in spent lye would be 14-16%. Fitted soap would contain about 0.5%.

Washed soap next enters fitting section where various fat-soluble impurities, such as hydroxy fatty acids and low molecular weight fatty acids are removed. This also improves milling properties of the soap.

During the fitting operation two variables must be fixed. These are: 1) Soap content of entire soap mass. This is adjusted by proportioning pump P4 for the fitting electrolyte. 2) The desired composition of the nigre. This factor is set by means of the electrolyte com-

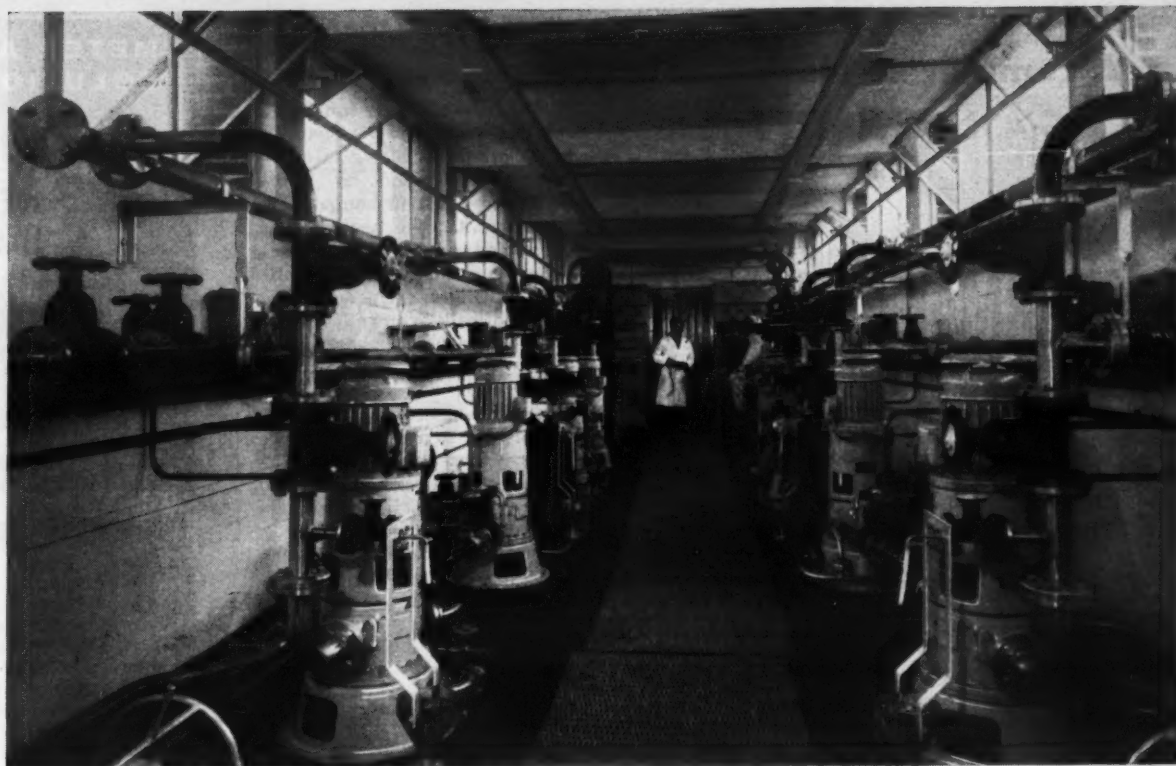


Photo by courtesy of the United Kingdom Atomic Energy Authority

LaBour Pumps Handle Tough Atomic Energy Jobs

The LaBour Type G Packingless Pumps in the picture are part of more than 250 LaBour Pumps in this one establishment of the United Kingdom Atomic Energy Authority. Where the job is difficult, or where failure of a pump can be especially costly or hazardous, you are likely to find LaBour Pumps on the job. British engineers, like those in the rest of the world, know that when you can't afford to take a chance you take a LaBour.

The pumps in the photograph were built by

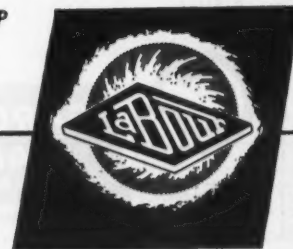
British LaBour Pump Company, Ltd., in London. In every essential respect, including the carefully controlled casting of corrosion resistant alloys and the final performance check before delivery, they are identical with American-built LaBour Pumps.

British or American, LaBour means dependability in pumping service—and the dependable pump is always the economical one, too. We'll be glad to show you what a LaBour Pump can do for you. Just ask us.

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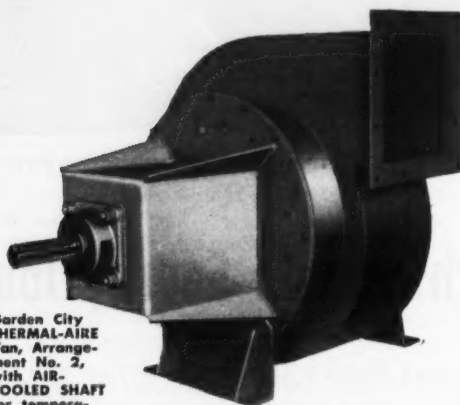
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Check 2235 opposite last page

IDEAS

position which is controlled by the changes in viscosity.

At all times fitting is thoroughly controlled by automatic constant-composition instruments. The neat soap is produced at the precise degree of fitting desired. Quantity of nigre formed is also automatically controlled.

After reaching phase equilibrium for the fitting in columns K5a and b, the fitted soap is separated from the nigre by centrifuge S4. To avoid increasing concentrations of hydroxy acids and low molecular fatty acids, a certain amount of the nigre is continually bled off from the system. Normally up to 10% of the nigre is sent to the slop tank for rework. Remainder is returned to last washing stage.

The fitted neat soap then goes to additive section K6 where material is mixed with fillers prior to going to final drying, milling, plodding, and stamping operations.

(Article is based on paper presented by Messrs. Fredrik T. E. Palmqvist and Frank E. Sullivan, The De Laval Separator Company, at recent meeting of the American Oil Chemists' Society.)

(Further information about Centripure continuous soap-making process may be obtained from The De Laval Separator Company, Poughkeepsie, New York.)

Check 2236 opposite last page.

Quick opening advantage of lift-plug valves on extractors

Have withstood abrasive
action of process

Fourteen 4" non-lubricated, lift-plug valves have given good service in the soluble coffee plant of The Kroger Co., Cincinnati, Ohio. Valves seal extractors while coffee is being extracted and can be quickly opened to discharge grounds to a hopper outside.

Plant has 14 extractors, each of which holds about \$1000 worth of product. Prevention of leaks with reliable valves

METER ACIDS, ALKALIES, SOLUTIONS, OILS, WATER



Whatever the liquid, you can meter and save!

The operator, in the photo above, is pre-setting the desired quantity on a Rockwell stainless steel meter prior to delivery to the reactor in a polyvinyl production process. The meter mechanism automatically shuts off when the pre-set quantity is reached. It's simple and quick to batch and blend liquids this way . . . and without contamination, fumes or hazards.

Wherever liquids are stored, mixed or consumed you'll be ahead to measure with Rockwell industrial meters. There's a size, type and metal for practically every liquid. Write for Bulletins.

ROCKWELL MANUFACTURING COMPANY, PITTSBURGH 8, PA

Check 2237 opposite last page

NEW EJECTORS Cut Vacuum Costs

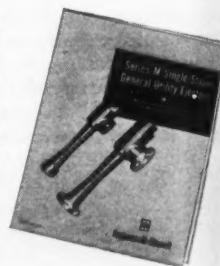


Steam inlet connection with stainless steel nozzle.

Cast-iron body with suction chamber and diffuser in one piece.

New Series M Steam Jet Ejectors, with rugged, two-piece construction, offer big savings for general vacuum service

FOR CREATING vacuums, there is nothing simpler or more reliable than the new Ingersoll-Rand Series M ejectors. Designed to operate with 75 to 200 psig steam, they can handle either dry or wet gases and can be used for priming pumps and other hydraulic equipment. The low-cost Series M line includes 1½", 2" and 3" sizes with threaded connections and 4" size with flanged suction and discharge. For full details, send for new Bulletin No. 9046.



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Check 2238 opposite last page

CHEMICAL PROCESSING



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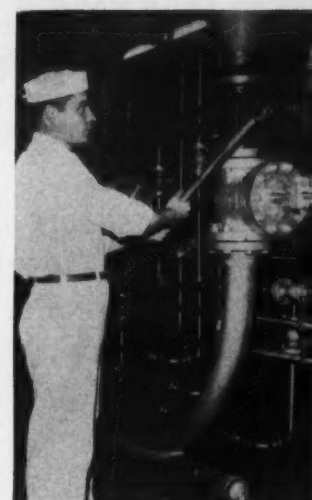
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CP Staff Photo

Operator opens lift-plug valve on bottom of extractor. Plant uses valves of this type on each of the 14 extractors

is a key factor in avoiding loss of valuable product. Also, fact that these lift-plug valves are non-lubricated eliminates possibility of product contamination.

Lift-plug valves have withstood the severely abrasive conditions, temperatures to 325°F, and pressures to 150 psi. No corrosion has been noted and no leakage has occurred. Each lift-plug valve is opened and closed twice each 50-60 min cycle. First bank of seven valves was installed in Dec. 1956 and second bank in Nov. 1957.

Valve uses the lift-turn-re-seat principle which provides ease of operation. Since seat is exposed to line pressure, this force acts to press seat more firmly against plug. Valve is manufactured of forged carbon steel.

(Lift-plug valve is product of Valve Div., Cameron Iron Works, PO Box 1212, Silber Rd., Houston 1, Texas.)

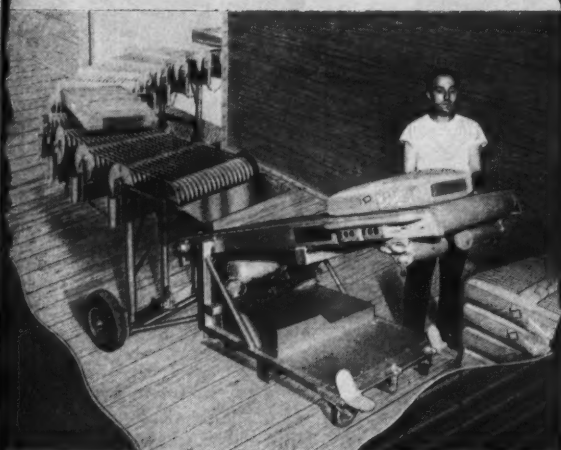
Check 2240 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Check 2239 opposite last page

One-Man Loading for Box Cars and Trucks Is Now Possible in All Chemical Plants

New Power-Curve Swivel Stacker & Loader Shoots Bags into Place, Replaces Slow Hand Truck



The Power-Curve Swivel Stacker and Loader at a large chemical plant uses but one operator who merely guides bags a little with one hand as they stream into the car direct from the Packer. The single operator replaces a crew of three.

(Special)—The latest in bag loading techniques is now being demonstrated to chemical plant operators who are fed up with the slow, old-fashioned hand wheel truck. A single conveyor-stacker system conveys the bags all the way from the packing machine and speeds up the loading, delivers cleaner, neater bags, reduces in-transit losses, and recovers spillage and loose material within the plant. The Power-Curve system is able to amortize its entire cost in less than a year.

In U.S. and Canadian chemical plants today there are in daily use 184 Power-Curve units, including 46 Packer and transfer conveyors, 61 bag flatteners and elevators, and 77 box car and truck loaders. Vir-

tually every type of dry chemical product is represented in the list of Power-Curve owners, with new additions every month.

Backing up the news of the money saving new system is a network of Power-Curve representatives in all areas equipped with sound movies in color showing actual chemical operations and the effortless loading of the new swivel stacker.

For complete details write

the Chemical Sales Division

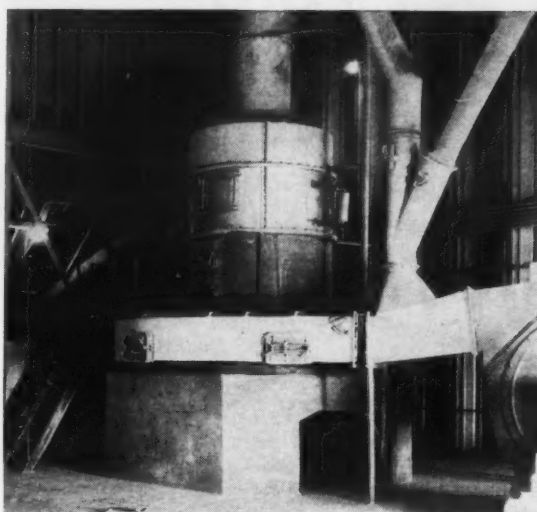
POWER-CURVE

CONVEYOR COMPANY

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Check 2241 opposite last page

IDEAS



Rotary dryer cuts moisture content of clay from 28-30% down to 8-10%

Giant pulverizing mill has 66" diam, possesses five rolls, can turn out 25 tons product per hour

Demand for the clay 'with a million uses' is rapidly on the upswing. Latest to go into production is ADM's Colony, Wyoming, mill. Boasting one of the largest pulverizing systems in the business, plant is true example of . . .

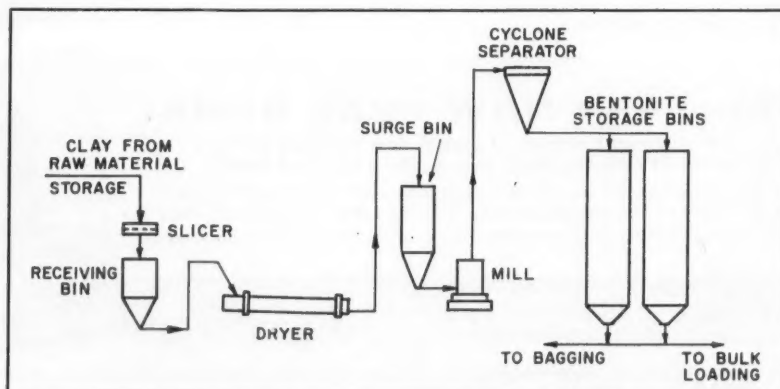
'Pushbutton' bentonite processing

TED F. MEINHOLD, Associate Editor
with **R. H. BURNELL**, Production Manager
Federal Foundry Division,
Archer-Daniels-Midland Company

One of the most modern bentonite processing plants in the country is now operating at Colony, Wyoming. Owned by Federal Foundry Supply Division, Archer-Daniels-Midland Company, the

installation went on stream in 1958 and is capable of turning out close to 500 tons product per day. Although primary purpose for building the plant was to supply bentonite for Minnesota's fast-growing taconite business, the facility also produces other grades to fill the needs of different industries.

The plant itself is actually quite compact, being housed in a 300' long, 50' wide, and 50' high building. Located on a



Simplified drawing shows major processing steps in bentonite plant

100-acre tract, the installation has approximately three million tons raw material available to it in the immediate surrounding area.

Process Description

Clay brought into the plant is first passed through a slicer which reduces the chunks to 2 to 3" diam. Stored in a bin, the material is next picked up by conveyors and sent to 8' diam x 60' long rotary dryer. Conveyor system feeding the dryer has weightometer attached to it which controls amount of clay going into dryer.

Dryer reduces moisture content of the material from 28-30% down to 8-10%. Dry-



Switch boxes, controls, timers, and other auxiliary devices are all located in central control room

ing conditions are rigidly controlled. Instruments constantly keep track of the exhaust gas temperature and dew point. When these change, due to moisture content variations of feed material, auxiliary controls automatically readjust feed rate to dryer to insure continued product uniformity.

Boasts Giant Mill

The plant claims that it has one of the largest bentonite pulverizing mills in use today. Unit has 66' diam, possesses five rolls, and has approximate capacity of 25 tons per hour pulverized bentonite, 90% passing through 200 mesh screen. The huge mill, together with all of its auxiliary equipment, operates fully automatic, feeding milled ma-

Simplicity in steam traps can effect big savings in parts inventory and maintenance time

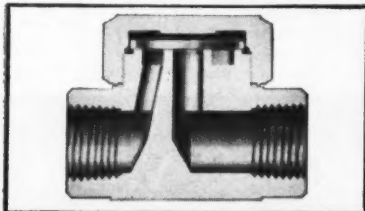
by John W. Ritter, Test Engineer
SARCO Company, Inc.

The function of all steam traps is to release condensate and prevent steam loss. However, the method of trapping can make a great difference in cost and effectiveness.

In the Sarco Thermo-Dynamic Steam Trap, the method is fundamental. Air or condensate entering the trap must flow from the inlet tube, radially across the underside of the disc valve, to the outlet. The space between the inlet tube and the disc forms a nozzle in which the static pressure energy of the incoming fluid is partly changed to velocity across the underside of the disc, with a resultant decrease in pressure. (This will be recognized, of course, as the Bernoulli Principle.) Use of this fundamental method means reliability in operation.

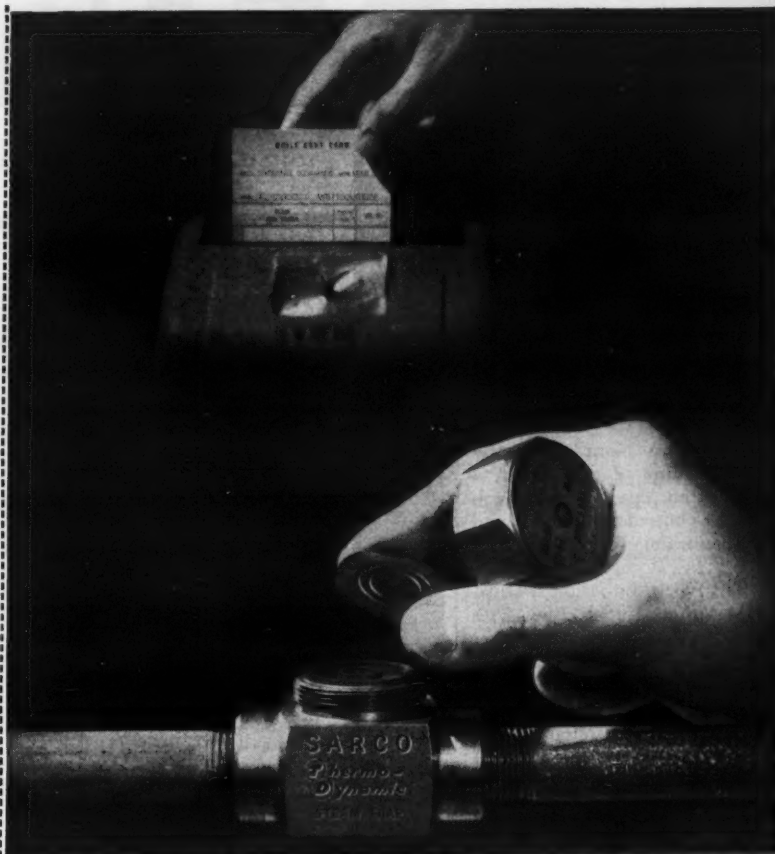
As the high velocity fluid jet strikes the side of the upper chamber, some recompression takes place, so that the pressure above the disc becomes greater than the pressure below it. The pressure reduction under the disc and the pressure recovery above it depend on the internal energy of the fluid. As the condensate above nearly approaches steam temperature, its internal energy is enough to overcome the upward force at the inlet tube and the disc snaps down in the inlet tube, which is the inlet valve seat.

Simultaneously, the disc also seals the outer ring, which isolates the space above the disc from the outlet. The disc valve is therefore held firmly against the inlet valve seat until the pressure in the control chamber is reduced by condensation. The upward force then exceeds the downward force and the disc valve opens.



This 3-part Sarco TD Steam Trap has only one moving part—the hardened, polished stainless steel disc.

No other trap uses the velocity of the fluid to operate the valve or uses the recompression of the flowing fluid to trap the valve closed and to hold it closed. When it closes, it closes tightly—no "operating steam" leaks out.



**40 seconds inspection time—
that's all it takes
for a SARCO TD Steam Trap**

Just back off the cap of a Sarco TD. Lift out its single moving part, the stainless steel disc. Wipe it off, and drop it back. No adjustment is ever required, at any load or any pressure in its range—from 10 through 600 psi.

The TD operates in any position, won't blow steam at any load. Small as a tee fitting, it can be installed in tight places. Its versatility and reliability cut cost of big replacement inventory.

Write for "Literature Kit 2A" today and get latest bulletins on the TD Steam Trap and other Sarco steam traps. Remember that Sarco can give you impartial advice on *Production Planned steam trapping* because . . .

5605-B

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Check 2242 opposite last page

terial to two 500-ton capacity storage silos.

From the silos, product is conveyed either to bag packers or to bulk loading facility. The packer bags the material into either 50 or 100 lb loads. Unit is a two-tube packer, air-flow type, capable of filling 500 bags per hour.

Specifications of final product vary from 85% through 200 mesh screen to 90% through 350 mesh. Material meeting custom specifications is also made. Three basic grades are produced: low, medium, and high gel material.

Pushbutton Plant

The entire plant is, in the true meaning of the words, a pushbutton operation. Switch boxes, controls, timers, and other auxiliary devices are located in a central control room. All production equipment is so interlocked with controls, that if anything goes wrong with a specific unit, there will be no jam-up in production.

For example, if a feeder or screen becomes plugged or overloaded, every machine in the line will automatically begin to shut down after a specific time interval.

Vibration Control

The 66" mill is equipped with a vibration control unit. If feed to mill should stop and unit begins to run dry, excess vibration will occur. Control unit will automatically shut down the mill when vibration exceeds predetermined point.

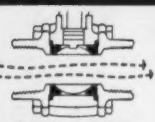
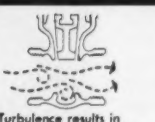
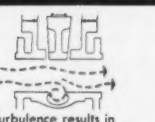

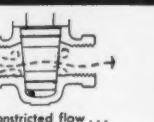
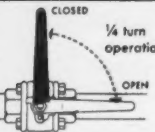
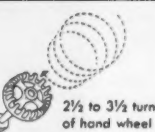


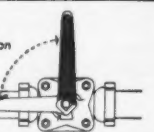
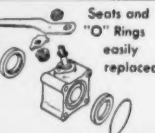


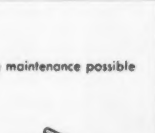
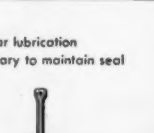


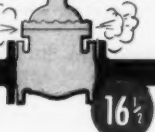


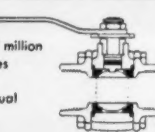
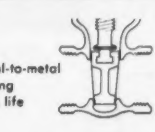
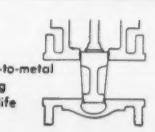


(Further information about bentonite products may be obtained from Federal Foundry Supply Division, Archer-Daniels-Midland Company, 2191 West 110th St., Cleveland 2, Ohio.)

Check 2243 opposite last page.

(Raymond pulverizing system was manufactured by Raymond Division, Combustion Engineering, Inc., 1116 W. Blackhawk St., Chicago 22, Illinois.)

Check 2244 opposite last page.

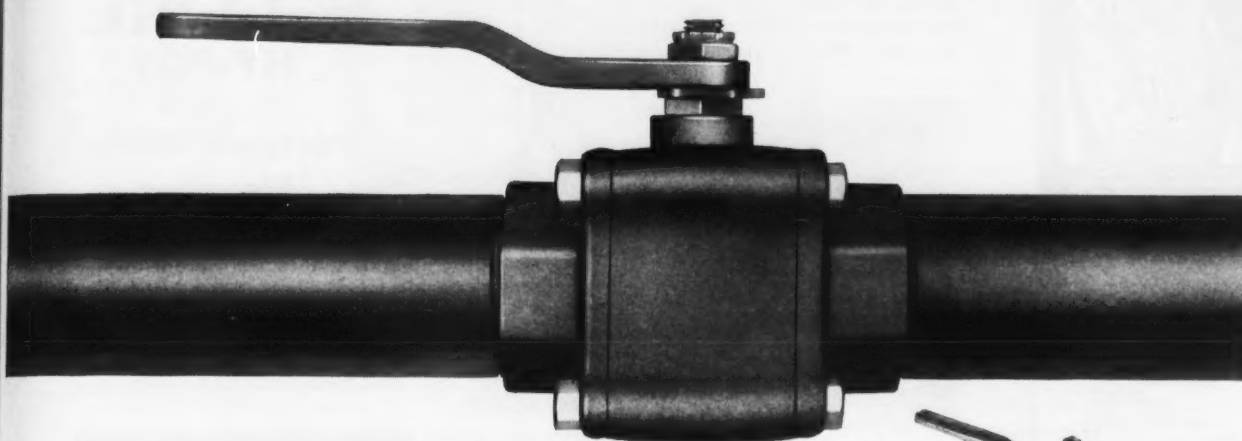
COMPARE . . .

ECON-O-MISER	GATE VALVE	FLANGED GATE VALVE	DIAPHRAGM VALVE	LUBRICATED PLUG VALVE
 Smooth round flow	 Turbulence results in excessive pressure drop	 Turbulence results in excessive pressure drop	 Turbulence results in unusually high pressure drop	 Constricted flow ... pressure drop
 CLOSED 1/4 turn operation OPEN	 2 1/2 to 3 1/2 turns of hand wheel	 2 1/2 to 7 turns of hand wheel	 2 1/2 to 3 1/2 turns of hand wheel	 1/4 turn operation
 Seats and "O" Rings easily replaced	 Valve normally thrown away	 30% to 50% of purchase price	 In-line maintenance possible	 Regular lubrication necessary to maintain seal
 CENTER TO TOP—OPEN 3 1/2	 12 1/2	 16 1/2	 7 1/2	 10 1/2
 Half million cycles not unusual	 Metal-to-metal seating limits life	 Metal-to-metal seating limits life	 Better than gate valve	 Very good if lubricated regularly

THE ECON-O-MISER BALL VALVE
IS THE IDEAL REPLACEMENT FOR MOST
ON-OFF VALVES NOW IN USE IN THE
PROCESS INDUSTRIES!

MORE EFFICIENT . . . LESS COSTLY

THE ECON-O-MISER BALL VALVE



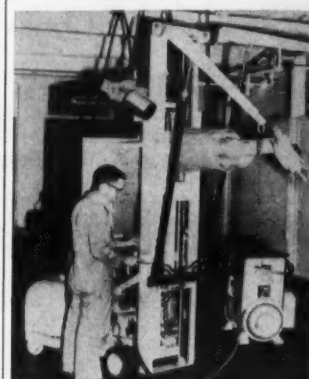
Remote-control robots perform maintenance in radioactive areas

Six units can be controlled by master control console

A six-unit robot fleet has been developed to perform maintenance and repair work in radioactive areas where humans cannot safely enter. Fleet is independently and remotely controlled by radio signals from control console. TV system and four-foot thick lead-glass window permits viewing of operations.

Largest robot is three-ton eight-foot-high fork-lift truck with three arms. One of these is human-arm-type mobile manipulator.

Other units in fleet are tow truck, pipe welder that can



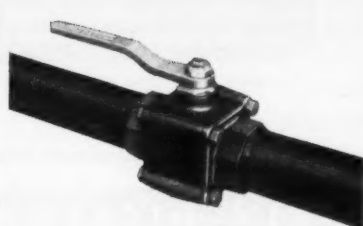
Largest of robots is three-armed three-ton model which can thread pipe and lift heavy loads. TV camera at upper left provides clear view of task

perform six-inch weld in 30 sec, pipe cutter that can cut 10" pipe, and 50-ton crane with drive mechanism located behind radiation shield.

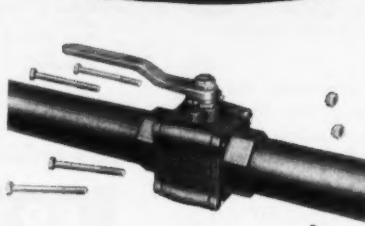
In operation of units, messages are fed into electronic-grid complex which transmits coded commands ultrasonically to robots. Commands are then decoded by units and carried out. The equipment is installed at Babcock & Wilcox Co.'s plant in Lynchburg, Va.

(Remote-control robots are development of Atomic Energy Division, The Babcock & Wilcox Company, 161 E. 42nd St., New York, N.Y.)

Check 2246 opposite last page.



Compact, efficient ECON-O-MISER Ball Valves are today's smoothest operating on-off valves. A quarter turn of the handle allows full operation and you can tell at a glance whether the valve is open or closed. More... ECON-O-MISER Ball Valves act as both valve and union... eliminate costly inventory and labor. Minimum turbulence and greater economy make this valve ideal for hundreds of applications.



Remove four nuts... four bolts... and the entire center section lifts out for servicing. Quick, convenient maintenance saves money and this unique design means pipe ends never have to be removed from the line. Seating surfaces and O-Rings are easily replaced... whole valve back in operation in minutes. Reduces inventory expenses and frees maintenance personnel from time consuming repairs.



The ECON-O-MISER Ball Valve is available in many combinations of seats, O-Rings and body materials. Almost any media can be handled by the ECON-O-MISER and sizes range from 1/4" through 6". Made of bronze, aluminum, carbon steel, stainless steel or aluminum bronze. We'll be happy to furnish information or application data.

THE ONLY VALVE IN INDUSTRY THAT SERVES AS BOTH VALVE AND UNION!



Complete, technical information in new "Comparison" bulletin.

Request EB 101 on your letterhead or fill in coupon.

NAME _____ TITLE _____
 COMPANY _____
 ADDRESS _____
 CITY _____ STATE _____

☐ Please forward bulletin EB 101. ☐ Please ask sales engineer to call for appointment. ☐ Send information on ECON-O-MISER FLANGE BALL VALVE.



WORCESTER VALVE CO., INC.
 DEPT. C • 16 PARKER STREET • WORCESTER, MASS.

Check 2245 opposite last page

DESTINATION: TOMORROW!

TODAY THE E/M SHOULDER HOLIDAY DETECTOR AND THE E/P PULSE TYPE DETECTOR FOR DAMP CLIMATES ARE ANSWERING THE FUELINERS' NEED FOR A DEPENDABLE, FULLY PORTABLE, GENERAL PURPOSE ELECTRICAL INSPECTION INSTRUMENT. BOTH MODELS CAN BE USED FOR A FULL DAY WITHOUT RECHARGING THE BATTERY. ALL WRAPPED SURFACES, INCLUDING PIPE, CAN BE QUICKLY AND ACCURATELY INSPECTED FOR WIDS, PINHOLES, BREAKS, SCRATCHES AND BURNED OR COOKED SPOTS.



TOMORROW THESE SAME DETECTORS WILL BE USED IN THE INSPECTION OF TUBING ON OUTER SPACE ROCKETS, FOR TINKER & RASOR DETECTORS ARE DESIGNED FOR THE FUTURE.



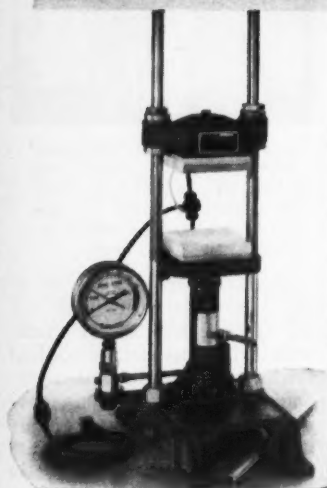
DISTRIBUTORS
Crutcher-Rolls-Cummings Inc., Houston, Texas
Remco Manufacturing Co., Inc., Tulsa, Oklahoma
Canadian Equipment Sales & Service Ltd., Edmonton, Alberta, Canada
Bob Herrick, Norwalk, Conn.
Harrisburg, Penna.
Falcon Line Products Corp., Elizabeth, N.J.
Export Agents ... Frazer & Hanson Ltd., San Francisco, Calif.



Electronic Detectors for every Industry
TINKER & RASOR
417 AGOSTINO ROAD, P. O. BOX 281, SAN GABRIEL, CALIFORNIA

Check 2247 opposite last page

The CARVER LABORATORY PRESS



...Solutions
for
Pressing
Problems



Accurately controlled pressures to 20,000 lbs.; 6-inch gauge mounted on base. Carver Standard Accessories include Electric or Steam Hot Plates, Carver Test Cylinders, Swivel Bearing Plates, Cage Equipment. Available from stock. Write for catalog.

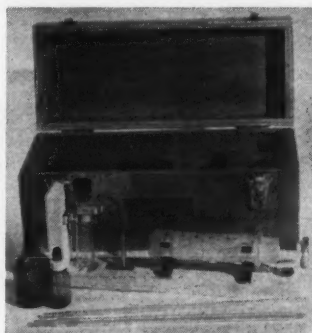
FRED S. CARVER INC.
HYDRAULIC EQUIPMENT
11 CHATHAM ROAD, SUMMIT, N. J.

Check 2248 opposite last page

IDEAS

Air-sampling test kit detects gases, vapor on the spot

Air-sampling test kit can be used for making on-the-spot determinations of gases and vapors for safety and industrial-hygiene investigations. Kit may also be utilized to

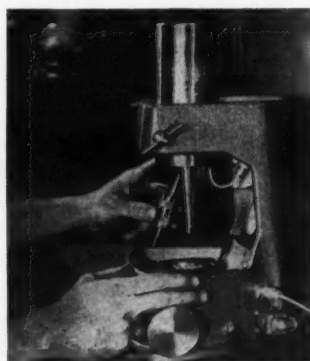


Air-sampling test kit is adaptable to a stack sampler

study new processes via stack emissions and for conducting routine determinations of sulfur dioxide from contact-acid-plant stacks.

(Air-sampling test kit is product of Compact Air Samplers, 825 Belmonte Park North, Dayton 5, Ohio.)

Check 2249 opposite last page.



Ultrasonic drill

... has automatic tuning control system which precludes constant retuning by operator. Drill is said to be only piezo-electric-type ultrasonic model available to industry.

Unit will drill, slice, en-

DRUMS . . . Pick Up, Move, Stack, Dump — Easier, Faster



with
New

**Weld-Bilt
HY-BOY**
Verti-Lift
Portable Drum
Elevator

"Weld-Bilt"
PRODUCTS

Great time-savers, at new low cost, HY-BOY "Verti-Lifts" load, unload, store, stack drums in less time and effort. More important—they provide fast, safe front or side tilting mechanism for efficient "last-drop" emptying. Electro-Hydraulically operated, with heavy duty battery, built-in charger, capacity, 1500 lbs., available in models for lifts from 60" to 112".

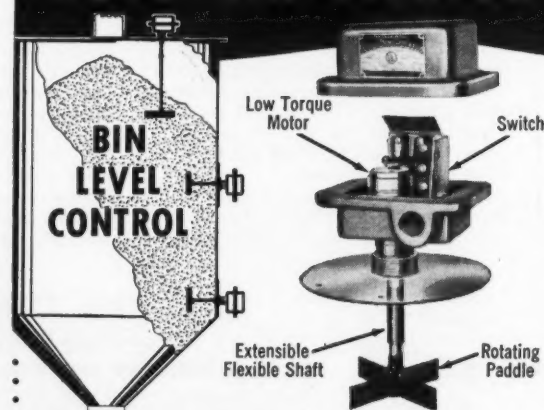
Write for HY-BOY Catalog CM-558 and prices on new Drum Handling HY-BOY Verti-Lift Portable Elevators.

WEST BEND EQUIPMENT CORP.
MATERIALS HANDLING ENGINEERS

322 Water Street, West Bend, Wisconsin

Check 2250 opposite last page

ROTO-BIN-DICATOR



HIGH IN PERFORMANCE - All Models Heavy Duty

LOW IN COST - Most Popular Model \$55.00

FIRST IN SALES - Since 1957

Underwriters' Laboratories Listed
General Purpose and Explosion-proof Models

Product of
THE BIN-DICATOR CO.
13946-D Kercheval, Detroit 15, Mich.

Write for detailed literature or phone Valley 2-6952

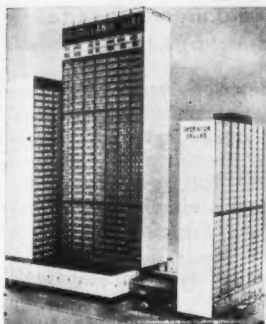
WE SELL DIRECT • PHONE ORDERS COLLECT

Check 2251 opposite last page

CHEMICAL PROCESSING

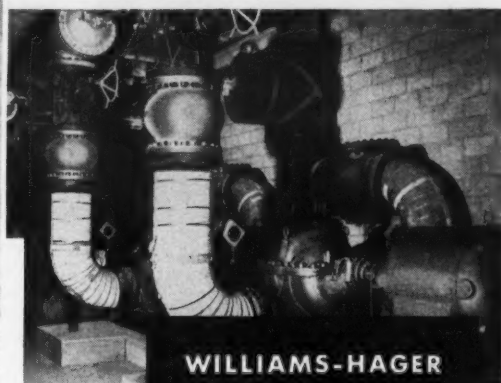
SURE PROTECTION

against WATER HAMMER



Architects and Engineers
Welton Becket, FAIA and Associates
General Contractor
J. W. Bateson Co., Inc., Dallas
Mechanical Contractor
Farwell-Wallace, Dallas

At the dramatic new Southland Center in Dallas, 57 Williams-Hager Silent Check Valves protect the plumbing, heating and air conditioning systems from surge pressures and resulting water hammer. Write for Bulletins: No. 654 on the Valves, No. 851 on Cause, Effect and Control of Water Hammer.



WILLIAMS-HAGER

Silent
Check Valves

THE WILLIAMS GAUGE CO., INC.

146 Stanwix Street

2 Gateway Center • Pittsburgh 22, Pa.

Our 73rd Year 1886-1959

Check 2252 opposite last page

jitterbug the unique grain cleaner

Bauer
No. 208-2A

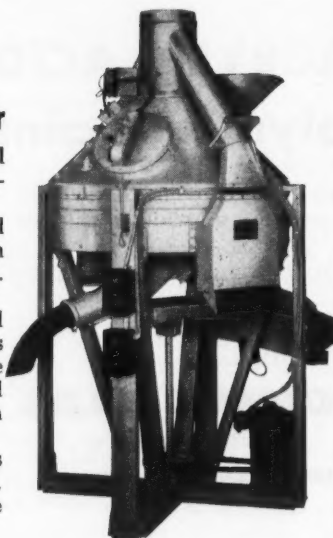
Specific Gravity Separator

It's called the Jitterbug in the seed industry because of its various internal movements.

Shelled corn, other grains, and seeds are cleaned by a combination of pneumatic and mechanical forces. There's no other separator like it.

Debris is sucked out by air and vibrated out mechanically. The grains or seeds are thoroughly cleaned at the rate of up to 6,000 lbs. per hour. And all this is done in a machine which covers only 4' x 4' floor space.

Our specific gravity separators are fully explained in Bulletin F-16. Ask for a copy. Do it now while the subject is on your mind.



THE BAUER BROS. CO.

1770 SHERIDAN AVE. • SPRINGFIELD, OHIO

Check 2253 opposite last page

IDEAS

grave, shape, tap, broach, dice, shave, trepan, and machine. It is adaptable for shaping intricate parts to precision tolerances. Special abrasives in assorted meshes are available for drill in 1/2- and 1-lb quantities.

(Glennite ultrasonic impact-drill is product of Vibro-Ceramics Division, Gulton Industries, Inc., 212 Durham Ave., Metuchen, N.J.)

Check 2254 opposite last page.

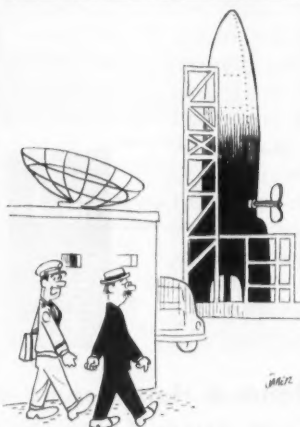
Chart-symbol typewriter has upper-case letters and 27 signs

Recently developed chart typewriter permits easy typing of complex material. Typewriter is development of SIE-MAG Feinmechanische Werke GMBH in West Germany.

Keyboard has normal upper-case alphabet and 27 chart symbols in lieu of lower-case letters. Attachment permits typing of charts on any kind of chart paper. With carbon-ribbon attachment, typed material is ready for offset printing.

(Chart-Typer is distributed by Continental Office Machines, Inc., 500 Fifth Ave., New York 36, N.Y.)

Check 2255 opposite last page.



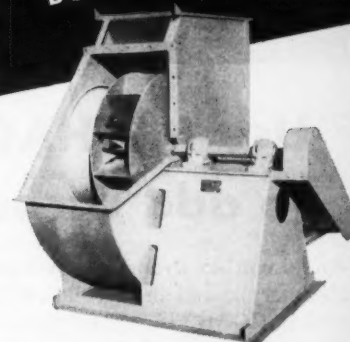
"What's this about a new rocket fuel you've developed, professor?"



Whirlex Forced Draft

heavy duty fans are designed for service in all types of boiler and industrial applications. Special design airfoil impellers provide maximum static efficiency. All-welded housing construction allows for a dust-proof, leak-proof operation.

Built for rugged service
WHIRLEX HEAVY DUTY FANS



Whirlex Induced Draft

heavy duty fans are available with either straight or evase type self supporting stacks. Special shaft cooling sleeves allow for the efficient use of air cooled bearings. Water cooled bearings can be furnished if desired.

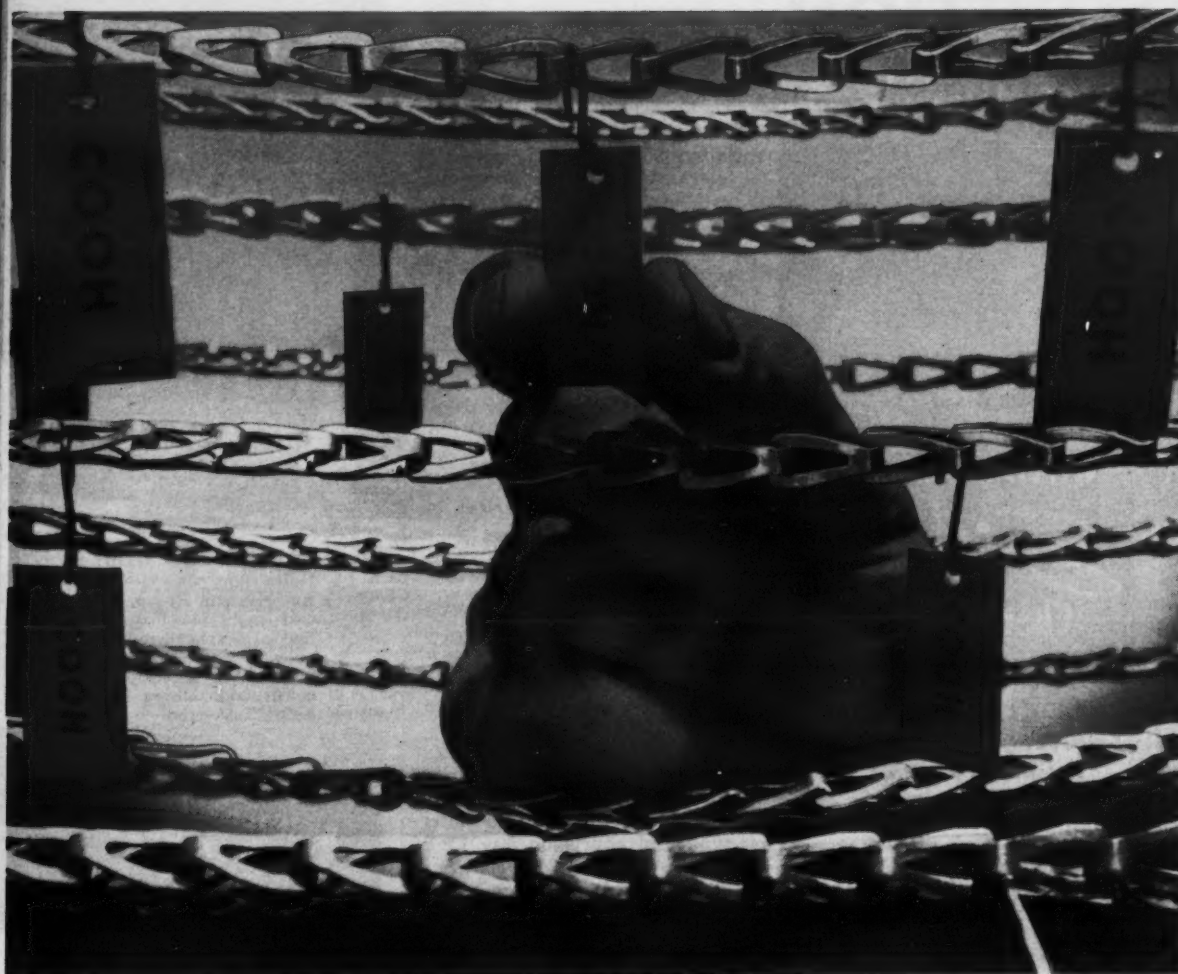
Write for complete information on these and other types of Whirlex industrial fans.

**Fly Ash
Arrestor Corp.**

200 N. 1st Street
BIRMINGHAM, ALA.



Check 2256 opposite last page



Use METHACRYLIC ACID or ACRYLIC ACID to add carboxyl groups to polymer chains

Would you like to add carboxyl groups to a polymer? Methacrylic acid and acrylic acid provide the answer. Adding COOH radicals to polymers by copolymerizing with one of these monomers may contribute benefits such as 1) improved adhesion properties, 2) better freeze-thaw and mechanical stability in polymer emulsions, 3) solubility in alkalies, including ammonia, 4) reactive centers for cross-linking by agents such as zinc oxide, diamines, or epoxides, 5) improved oil resistance, and 6) increased hardness, softening temperature, and abrasion resistance. Methacrylic acid and acrylic acid can be copolymerized with monomers such as styrene, acrylonitrile,

butadiene, isoprene, acrylates, methacrylates, vinyl chloride, vinyl acetate, vinylidene chloride, and divinylbenzene.

Write to Dept. SP-16 for technical literature on these monomeric acids.



Chemicals for Industry

**ROHM & HAAS
COMPANY**

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Other Rohm & Haas acrylic monomers

METHYL ACRYLATE • ETHYL ACRYLATE • BUTYL ACRYLATE • 2-ETHYLHEXYL ACRYLATE • METHYL METHACRYLATE • ETHYL METHACRYLATE • BUTYL METHACRYLATE • HEXYL METHACRYLATE • DECYL-OCTYL METHACRYLATE • LAURYL METHACRYLATE • STEARYL METHACRYLATE

Check 2257 opposite last page

IDEAS

Heat transfer research on liquid metals speeded with packaged loop

Industrial research centers and universities can now study liquid-metal heat transfer by means of a packaged system. This precludes time-wasting preliminaries of design and assembly of such a system.

Package is complete circulation system ready to begin operation as soon as it is placed into position. Unit is adaptable for research entailing heat-exchanger design,



Enclosure of liquid-metal heat-transfer test loop can be easily removed for maintenance or inspection

pump development, corrosion and mass-transfer studies, valve and thermal-insulation development, and high-temperature metal-stress investigations.

Unit incorporates heat-transfer loop with necessary auxiliaries such as heaters, coolers, electromagnetic pumps and flowmeters, heat exchangers, plugging indicator, cold trap, instruments.

(Packaged heat-transfer test loop is development of MSA Research Corporation, Subsidiary of Mine Safety Appliances Company, Callery, Pa.)

Check 2258 opposite last page.

NEXT MONTH

Are too-stringent A-waste disposal regulations hindering nuclear progress? Are they discouraging wider use of radioisotopes? Don't fail to read the thought-provoking article about this interesting topic in next month's Chemical Business section.

Operator injects test sample into vapor phase chromatograph, which separates components. These components then pass through time-of-flight mass spectrometer in center for identification. Analyses can be observed visually on oscilloscope screen at right of photograph



Used in conjunction with a vapor phase chromatography unit, complex mixtures of 42 or more components are identified quickly with —

speedy mass spectrometer

GORDON WEYERMULLER, Associate Editor
with **DR. NORMAN WRIGHT**, Head Of Spectroscopy Laboratory
The Dow Chemical Company, Midland, Michigan

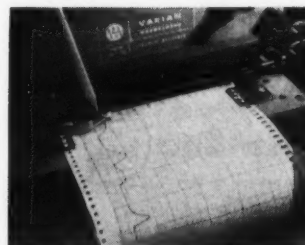
First production-line unit of fast mass spectrometer, a time-of-flight unit, has proved to be a valuable tool at Dow's Spectroscopy Laboratory at Midland. Information can be obtained with it in an hour that would otherwise take days. Most significant point is, that for the first time, laboratory is able to completely characterize extremely complex samples with a single pass through the instrument.

This analytical tool does almost instantly what conventional mass spectroscopy equipment takes 20-30 minutes to accomplish — and conventional equipment itself

has always been considered very fast compared to the test tube method of analysis.

Unit can analyze a compound 2000 times a second in normal operation. With slight modifications, this rate can be increased to 10,000 times a second. Analyses show up superimposed on each other as "blips" on an oscilloscope, which is similar to a radar screen. Analyses can be observed visually or they can be photographed and identified by comparison with Dow's file of 4300 standard mass spectra.

Time-of-flight mass spectrometer tells what components are present in a com-



Graphic recorder shows when one of test sample's components has exited from chromatograph. Each peak on graph represents different component. Height of peak indicates its quantity

pound by measuring the differences in time required for ionized fragments to travel down a tube after being shot out of an ion gun by an electric impulse.

The Dow "Spec" Lab scientists, with R. S. Gohlke in charge, have pioneered in an unusual use for the equipment

— teaming it up with vapor phase chromatography. Dow has used this combination to analyze mixtures with up to 42 different components. Material to be analyzed is injected into the chromatograph with a hypodermic syringe. It is carried along in a stream of inert gas, such as helium, through a helical (spiral) column. Column is packed with an inert product coated with a thin film of organic liquid.

Components of material being analyzed partition themselves between the organic film and the gas stream. As they progress through the tube, they are vaporized. Component with the lowest boiling point exists first and is quantitatively analyzed by a measuring device such as a conductivity cell. Remaining components are similarly

To next page



Who cares about your Wire Cloth Fabrications?

CAMBRIDGE does . . .

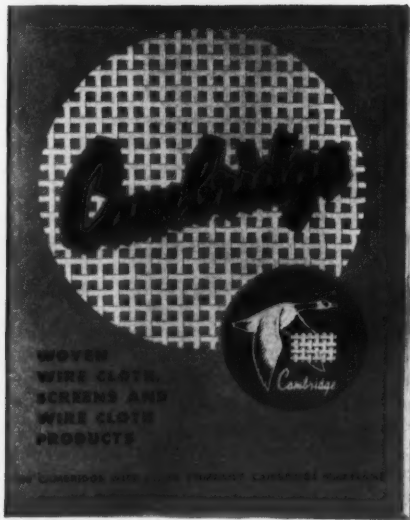
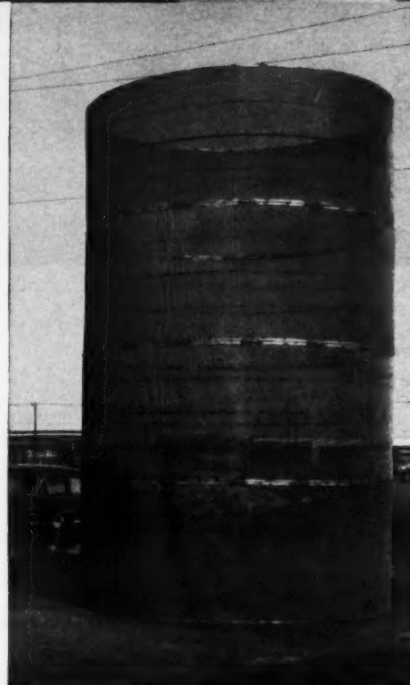
that's why you automatically get service with your order . . . whether you need dozens of midget strainers or a single giant-sized retaining screen.

Careful, competent workmanship and constant inspection assure you of quality . . . modern machinery and accurate scheduling assure you of prompt delivery. And, a Cambridge Field Engineer follows up your order to make sure our product is giving you the best possible service. Let us quote on your next order for wire cloth fabrications. We manufacture wire cloth from any metal or alloy—including titanium—in nine basic weaves. We'll work from your prints or draw up prints for your approval. Call your Cambridge Field Engineer . . . he's listed in the yellow pages under "Wire Cloth". Or, write for FREE 94-PAGE CATALOG.

The Cambridge Wire Cloth Co.

Department F • Cambridge 6, Md.

Manufacturers of Wire Cloth,
Metal-Mesh Conveyor Belts, Wire Cloth Fabrications



INSTRUMENTS & LAB

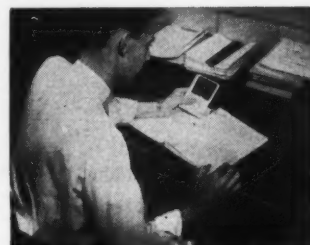
From preceding page

measured in their turn.

Chromatographic method accurately measures the quantity of the various components, but it leaves unanswered the question of what they are. That's where the time-of-flight mass spectrometer comes in. As the sample components are separated by the chromatograph, they are routed to the spectrometer, and speedily identified.

Example

For example, a sample of corn oil extract was shown to contain 42 components. Dow Laboratory was able to obtain this information and to identify



An identification of the component in question can usually be rapidly made by comparison to existing files of mass spectral data

fy all except four or five of the components in about three hours. Solving this problem with conventional separation techniques (distillation, perhaps) and subsequent identification of components could easily have taken several months — and one would not be as sure of the answers as with this new technique.

Technique is useful only for volatile samples (BP up to 250°C/760 mm) but for these samples it is as near to the ultimate in analysis as anyone has yet achieved.

Chromatography Unit

Chromatography unit in use at the "Spec" Laboratory was made by Dow. It has four different columns, each of which can be packed with a different type of material. This allows chemist to select column he wishes to use for a given analysis and gives instrument

To page 110

Check 2259 opposite last page

DATA SAVERS!

CP's Processing and Engineering Data Section is for you!

Each month, this section contains time-saving nomographs, tables, or charts which other data savers have found extremely useful in speeding calculations. They have been sent to us by our many readers.

Perhaps, you will find them to be of value to you.

A wide variety of information can be found in this section. So, no matter what your particular field you will find suitable data to aid you in your daily work.

And —

the section pages are designed to fit easily into regular data files.

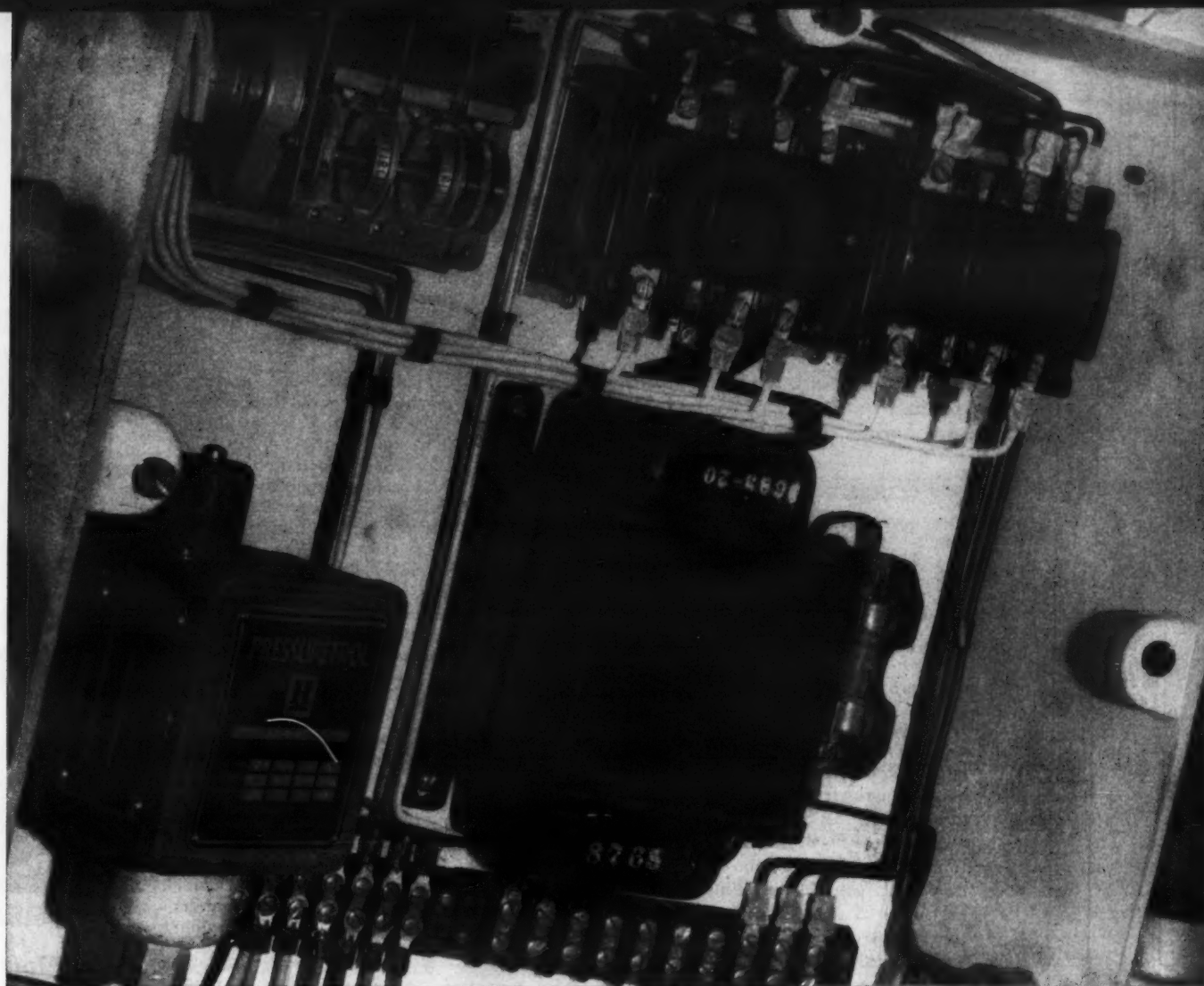
Keep them handy for use in making quick calculations in the plant or office.

Just cut along the marked edge, punch as indicated, and insert them into your notebook.

So —

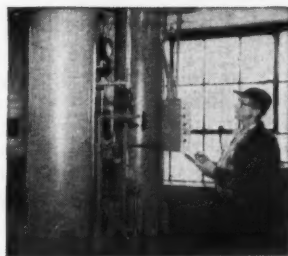
be sure not to miss this month's "Data Section." It begins on page 69.

For more information on product at right, specify 2260 see information request blank opposite last page.



For "set it and forget it" gas drying—

Come to Kemp



Kemp Dryer protects instrument lines at -25° for Quaker State's Farmer's Valley, Pa. plant. Fully automatic operation saves time and manpower, yet provides dependable service on a 24 hour basis.

Here's the nerve center of every Kemp Fully Automatic Gas Drying Unit. Drying process gasses and inerts . . . air for pneumatic instruments and tools . . . liquids . . . for pressurizing anhydrous liquids . . . this panel controls the Kemp Dryer surely and safely. Once timed to meet your program, it provides efficient drying on a continuous basis, without worry or excessive maintenance.

Note the precision with which even the wiring is connected. It's typical of the thorough workmanship going into every component of the Kemp Dryer. Kemp Dryers are built with care; built to last and perform year after year with dependability resulting from a quarter century's experience.

Whether your operation calls for a completely automatic Kemp Dryer, a semi-automatic model, or a simple, manually operated unit, there's a model and capacity to meet your needs. Kemp Field Engineers will gladly study your problem and make complete recommendations, even down to the proper desiccant (we select from over 20) to do your job best.



Your Kemp Representative is listed in *Chemical Engineering Catalog*. Call him for full information when you plan a new installation or wish to update an old one. Or write for Bulletin D-102. THE C. M. KEMP MFG. CO., 405 E. Oliver St., Baltimore 2, Md.



Convection Dryers



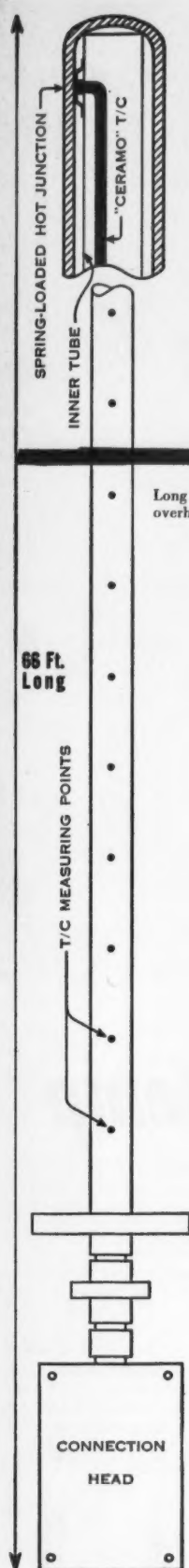
Inert Gas Generators



Nitrogen Generators



Orlad Dryers



66 Ft. Multi-Thermocouple Shipped to South Africa

**Three Long Multi-Thermocouples,
Totalling 194 Feet
Sent Across Ocean By Thermo Electric**

Long T/C Assemblies
overhang trailer

Thermo Electric makes thermocouples for just about every possible application—including some pretty unusual ones. The multi-thermocouple assembly diagrammed here is a good example. It's 66 feet long.

The longest of three, this assembly has a total immersion length of 63'7". The entire unit actually contains 12 different thermocouples—in progressively longer lengths from 9'1" to 63'7". These are enclosed in a 1½" I.P.S., Schedule 80 protection tube of type 304 Stainless Steel. Individual thermocouple construction is of T-E's "Ceramco"—ceramic insulated conductors encased in overall metal sheathing. O.D.'s are ½" with 22 gage Iron-Constantan conductors. Hot junctions are welded closed and, for fast response, are spring-loaded against the inner wall of the protection tube.

The three assemblies were sent by T-E to Durban, South Africa for installation in a catalyst reactor. They are typical of what Thermo Electric is currently doing in the field of temperature measurement. T-E equipment is being used all over the world for important temperature measuring jobs. Assemblies like this, used in deep vessels, will measure temperatures at any desired level. Thermo Electric also makes miniature thermocouples as small as ½" immersion length. Whatever your needs, for large or small thermocouples, for low or extremely high temperatures, for any type of application, contact Thermo Electric. Our extensive research, engineering and manufacturing facilities are at your disposal.

**Write For
Detailed
Information**



In Canada: THERMO ELECTRIC (Canada) LTD., Brampton, Ont.

Check 2261 opposite last page

INSTRUMENTS & LAB

Mass Spectrometer

From page 108

considerable flexibility. For column packing, Dow has used materials ranging from diatomaceous earth to Tide, the household detergent.

Mass Spectrometer

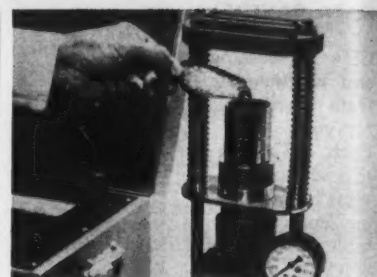
Mass spectrometer operates on the time-of-flight principle. Ions are made by a pulsed beam of electrons in the ion source, and ejected periodically into a comparatively long field-free region. Here, because of their different velocities, they separate according to their mass-to-charge ratio.

After separation, the ion bunches enter an electron multiplier where the ion signals are amplified for presentation on an oscilloscope whose trace has been triggered by the ion accelerating pulse. The mass of the ion peak can then be determined by its time of flight, shown by the positions of the peaks on the oscilloscope trace. Combination of high resolution with the speed of response and geometric simplicity of time-of-flight mass spectrometers makes possible the application of mass spectrometry to a number of analysis and research problems which heretofore have not been well suited to this technique.

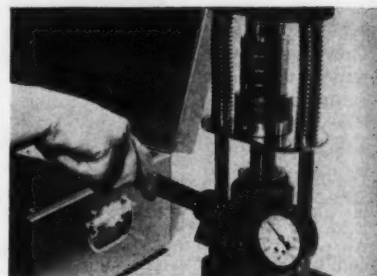
Development of this spectrometer began with the invention of a new ion gun which was capable of providing very high resolving power when used in a time-of-flight mass spectrometer. Further development work was encouraged by the inherent versatility of the instrument both in its operation and in its design. Many units of several different models have been delivered since Dow received the first one two years ago. These spectrometers were and are being produced to satisfy a number of different applications.

(Model 12-100 Time-of-Flight Mass Spectrometer is product Cincinnati Div., Bendix Aviation Corporation, 3130 Wasson Rd., Cincinnati 8, Ohio.)

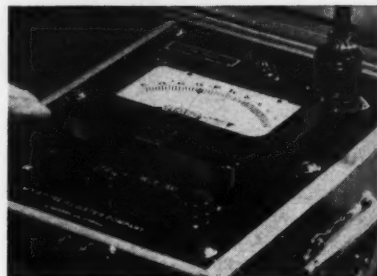
Check 2262 opposite last page.



FEED IT...



SQUEEZE IT...



READ IT...

G-5 Moisture Register for accurate moisture tests in 60 seconds

Fastest moisture test available with accuracy to 0%. Save production and lab time—no skilled labor needed. Use Electronic Moisture Register G-5 anywhere on granular, ground, loose, shredded and powdered materials. Hydraulic pressure assures homogeneous sample. Specially calibrated for ammonium nitrate, ammonium sulphate, toilet soaps, calcium carbonate, sulphur, ammonium perchlorate, sodium bicarbonate, polyethylene resins, many more. Accuracy guaranteed. Ask for free trial.

Write, stating material to be tested, and moisture range, or check No. 2263 on reader service slip.



Moisture Register Co., Dept. CPC
P.O. Box 910, Alhambra, Calif.

Check 2263 opposite last page

CHEMICAL PROCESSING

Organic-material samples are dried and ashed without sputtering

Incinerator is safe for use with flammable material

Uses: Incineration of small amounts of organic materials.

Features: Drying and ashing is performed without sputtering, odor, or fumes, even with noxious materials. Unit is safe for use with flammable materials.

Description: Incinerating temperature is attained by focusing rays from infrared lamp onto crucible. Crucible is supported at focal point of gold-plated parabolic reflector.

Normal temperature range is typified by fact that lead



Temperature in infrared-incinerator is obtained by focusing rays from infrared lamp to crucible supported at focal point of gold-plated parabolic reflector

chloride (MP—501°C) fumes in two to three minutes and lithium carbonate (MP—618°C) fumes in approximately 10 minutes. Infrared incinerator is fabricated of cast aluminum. Wire cage holds crucible at focal point of reflector. It is designed for use with 110v AC or DC.

(Infrared incinerator is product of National Instrument Company, 2701 Rockwood Ave., Baltimore 15, Md.)

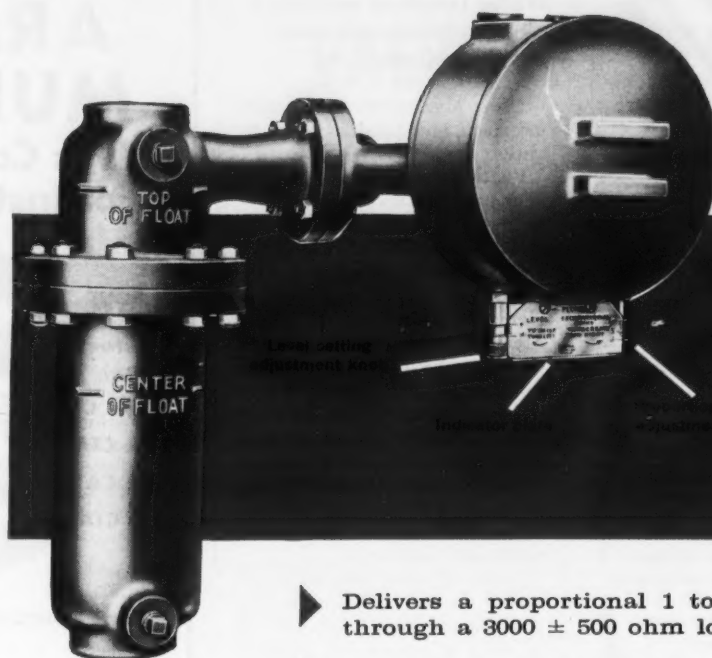
Check 2264 opposite last page.

NEXT MONTH

Do you need high-pressure facilities in your research work? Next month we'll look into Hoffmann-LaRoche's recently completed eight-cubicle installation . . . designed for safety.

NOW FISHER LEVEL-TROL®

FOR
**ELECTRONIC
SYSTEMS**



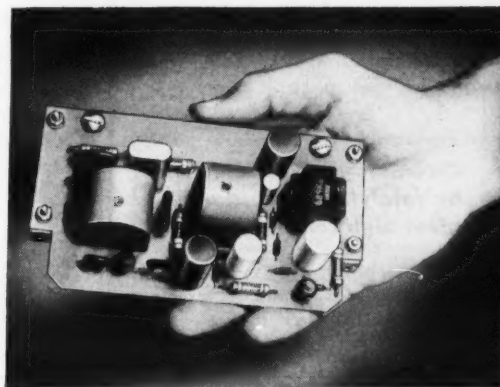
*Quick
accurate
external
adjustment*

- ▶ Delivers a proportional 1 to 5 milliamperes dc signal through a 3000 ± 500 ohm load.
- ▶ Has plug-in converter with printed circuit. Conventional leads and unnecessary wiring are eliminated.

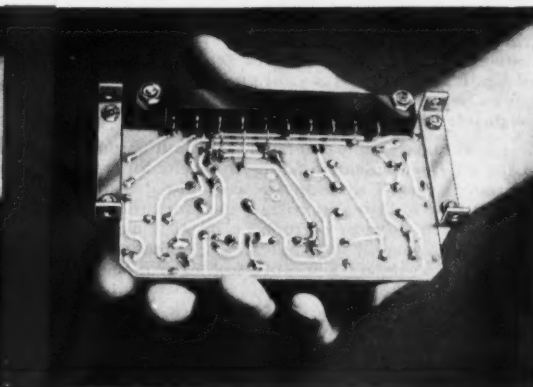
This Fisher explosion-proof Electronic Level-Trol features external adjustment for proportional band and liquid level height, and incorporates extreme simplicity of design throughout. Silicon transistors and diodes are used instead of the conventional vacuum tubes. You do not need any additional parts to reverse

action of the unit. With only .25% effect from $\pm 15\%$ supply voltage change, line voltage fluctuation is of negligible effect.

Fisher Bulletin F-85 will give you complete details on the Fisher Type 2300 Electronic Level-Trol. Send for it.



Plug-in electronic converter assembly.



Printed circuit of the converter assembly.



IF IT FLOWS THROUGH PIPE ANYWHERE IN THE WORLD . . . CHANCES ARE IT'S CONTROLLED BY . . .

FISHER GOVERNOR COMPANY

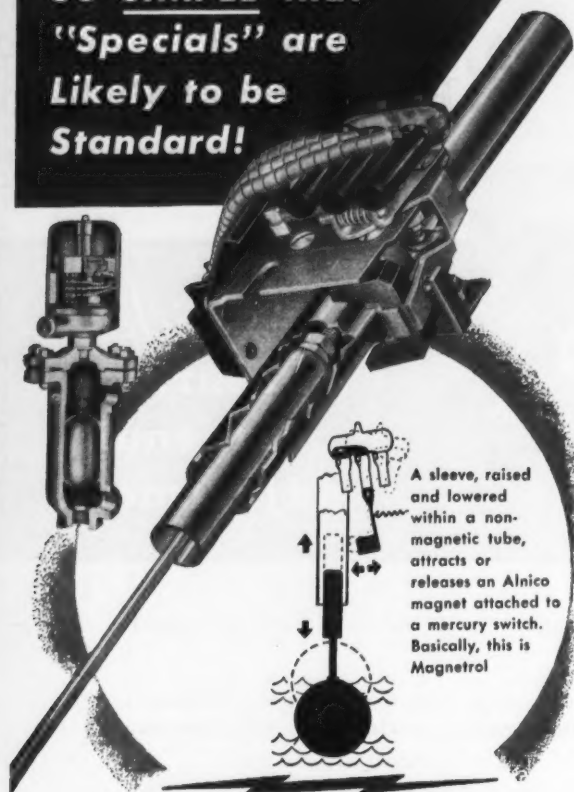
Marshalltown, Iowa Woodstock, Ontario London, England

CONTINENTAL EQUIPMENT CO. DIVISION, Coraopolis, Pennsylvania



Check 2265 opposite last page

So SIMPLE that
"Specials" are
Likely to be
Standard!



MAGNETROL

The World's Most Dependable LIQUID LEVEL CONTROL

Because of the utter simplicity of Magnetrol's magnetic operating principle, standard models can be easily adapted to meet any special requirements for pressure, temperature or corrosive liquids . . . and usually at little extra cost. This Magnetrol versatility has solved all kinds of tough level control problems . . . and given our engineers wide application experience that can be invaluable to you.

Magnetrol is so simple that failure is all but impossible! Using only permanent, unfailing magnetic force for its operation, there's nothing to wear out . . . no diaphragms or bellows to stiffen and rupture . . . no electrodes to short or corrode . . . no packing to bind or leak. Magnetrol is practically maintenance-free! Magnetrol units are available for controlling level changes from .0025-in. to 150-ft. . . with multi-stage switching when desired. Send coupon for full details.

MAGNETROL, Inc.

Send Coupon
For Full Details

MAGNETROL, Inc., 2129 S. Marshall Blvd., Chicago 23, Illinois

Please send me catalog data and full information on
Magnetrol Liquid Level Controls.

Name _____

Company _____

Address _____

City _____ Zone _____ State _____

Check 2266 opposite last page

INSTRUMENTS & LAB

**Water interface measured
along with product level
by same components**

Uses: Measurement of water interface and product level in tanks.

Features: Water interface and product level are measured by same basic components.

Description: Tank gage measures by means of sensing element suspended in tank. Element is quarter-length antenna which just touches product surface. Detected signals are balanced against fixed signal. Rise or fall of product level produces signal imbalance. Sensing element follows product level, since mechanism constantly attempts to maintain balance.

Same element also measures water bottom. When servo-mechanism switch at bottom of tank is turned on, element moves below product level until surface of water bottom is reached. Readings are recorded on same dial which indicates product height.

Water-interface-level readings may be taken remotely by means of auxiliary cabinet. In this manner, water levels as well as product levels, can be taken and recorded without leaving gage house.

(Gilbarco electronic tank gage is product of Gilbert & Barker Mfg. Company, West Springfield, Mass.)

Check 2267 opposite last page.

Chromatographic detection by catalytic combustion gives high sensitivity

Uses: Monitoring and analysis of a gas stream in which it is desired to detect and measure oxidizable gases. Particularly for use in well drilling for monitoring gas content of drilling mud.

Features: Catalytic-combustion detection gives high sensitivity. Use of air as carrier gas provides oxygen for combustion and permits use of shorter columns. This precludes utilization of tanks of hydrogen or helium.

Description: Chromatograph

CRESCENT ARMORED MULTITUBE

**Solves Corrosion Problems
For Instrument Tubing**

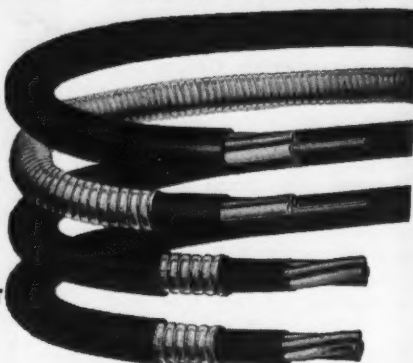
**IN FOUR
Corrosion
Resistant
Types**

Type CT

Type CTA

Type CAT

Type CTAT



**For Pneumatic and Hydraulic Instruments
and Control**

Crescent Armored Multitube® consists of long-length copper, aluminum or polyethylene tubes twisted together to permit bending without distortion. In each layer, one tube is a bright blue color, affording a fast means of identification from both ends.

Type CT—For damp or corrosive locations where a moderate degree of mechanical protection to the tube is required. It employs a corrosion-resistant thermoplastic sheath, resistant to water, acids, alkalis, oil, and is flame-retardant.

Type CTA—Where maximum mechanical protection is desired during and after installation, such as direct burial in concrete and for pulling into conduit.

Type CAT—For protection against corrosion to the armor and to the tubing.

Type CTAT—Combining the advantages of Types CTA and CAT, the fourth type illustrated has the polyvinyl chloride thermoplastic sheath both under the armor and over the armor, thus providing maximum mechanical and corrosion protection.

Available in long runs from 2 to 37 tubes of copper, aluminum and polyethylene tubing in sizes 1/4" O.D. This product is licensed under U. S. Patent No. 2,578,280.

Plastic Coated Single Tubes, copper or aluminum should be used to give corrosion protection to all single lines up to the final tube fitting, where trouble from corrosion may occur.

Send for New Bulletin No. 458-E

CRESCENT
INSULATED WIRE & CABLE CO.
TRENTON, 5, N. J.

Check 2268 opposite last page

CHEMICAL PROCESSING

is used in analysis of gases and vapors boiling below 80°C. Instrument combines monitoring unit with analytical unit.

Monitor side is automatic, periodically repeating unit with three short columns for quick separation of low-molecular-weight fractions. At preset intervals timing motor switches columns, adding measured sample of gas for analysis.

Stream of gas being monitored first passes through analytical side of instrument. If monitoring record indicates need of more thorough analysis, measured sample may be withdrawn.

Typical column for analytical unit will separate through n-butane in two minutes. Higher-boiling hydrocarbons take proportionally longer.

Sensitivity with 7½-ft dibutyl-phthalate-packed column and catalytic-combustion detection:

Hydrogen	7 parts per million
Methane	8 parts per million
n-Butane	20 parts per million

Higher sensitivities are possible with other columns.

(Hycalog Chronofrac is product of Precision Scientific Development Company Division, Precision Scientific Company, 3737 W. Cortland, Chicago, Illinois.)

Check 2269 opposite last page.

Polyethylene-lined drum requires no deposit

Recently developed five-gal drum, containing heavy-duty polyethylene-bag liner, is said to eliminate need for glass carboys in handling variety of solvents, chemicals, and other solutions.

Container has flexible polyethylene spout for pouring. Pouring opening is 63 mm. Liner thickness is 15 mils on top; body and bottom thickness are 12 mils. Container is 24-gauge ICC 37 P drum.

(Poly Bag-&-Drum is product of Chemical Manufacturing Division, Fisher Scientific Company, One Reagent Lane, Fair Lawn, N. J.)

Check 2270 opposite last page.

NEW TAYLOR ELECTRO-PNEUMATIC VALVE POSITIONER

Couples advanced electronic control with smooth pneumatic action

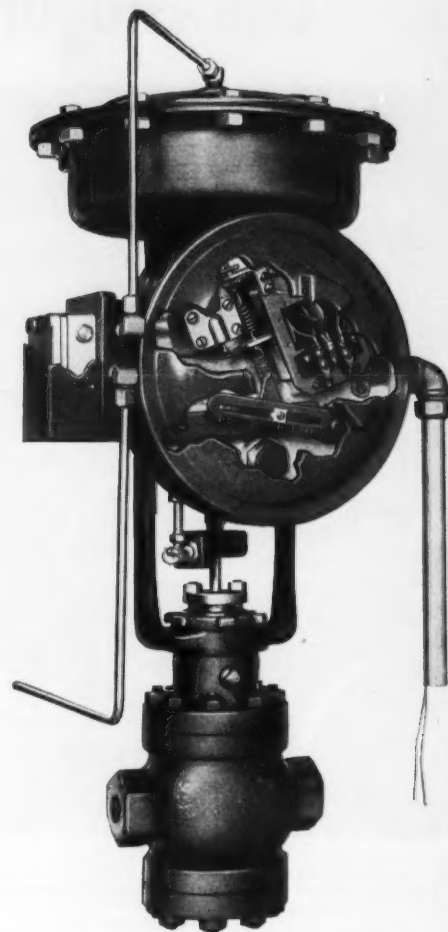
A skillful combination of new and proven design features, the Taylor 713R Valve Positioner converts an electrical milliamper input from the controller into a pneumatic force insuring positive positioning of the valve actuator proportional to the electrical input. It permits full utilization of the desirable characteristics of electronic control, coupled with the power and smooth throttling action of pneumatic valve actuators.

The 713R has unmatched stability, due to a powerful, balanced armature that reduces the effects of shock and vibration to a minimum. It is designed for use in hazardous areas designated for Class I, Group D, Division I equipment.

CHECK THESE FEATURES

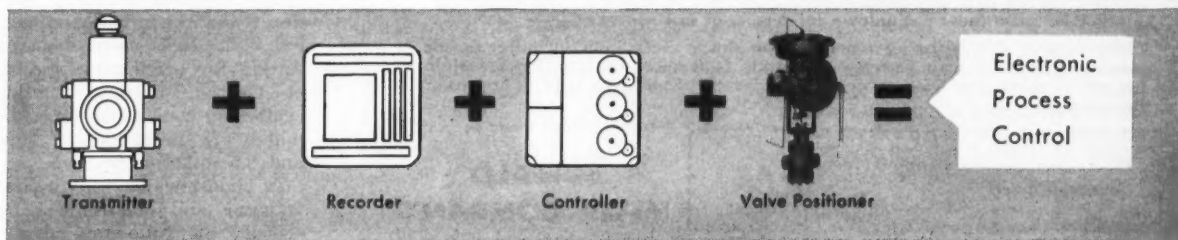
- 1. High threshold sensitivity**—made possible by compact, powerful torque motor which positions stainless baffle with respect to stainless nozzle.
- 2. Faster operating**—due to high capacity leakless booster relay.
- 3. Wide supply pressure range**—operates with air supply pressure between 20 and 50 psi.
- 4. Economy of installation and operation**—designed for use on regular plant air.
- 5. Easy, safe servicing**—externally-mounted booster relay can be removed without breaking the electrical circuit, and without affecting its protection in hazardous areas.
- 6. Standard input ranges**—1 to 5 ma, 4 to 20 ma, and 10 to 50 ma dc signal.
- 7. Great adaptability**—same basic positioner can be applied to reverse or direct actuators, reverse or direct valve bodies, and other makes of actuators.

See your Taylor Field Engineer, or write for Bulletin No. 98334. Taylor Instrument Companies, Rochester, N. Y., or Toronto, Ontario.



Taylor Electro-pneumatic Valve Positioner mounted on new Taylor LIN-E-AIRE® Valve Actuator.

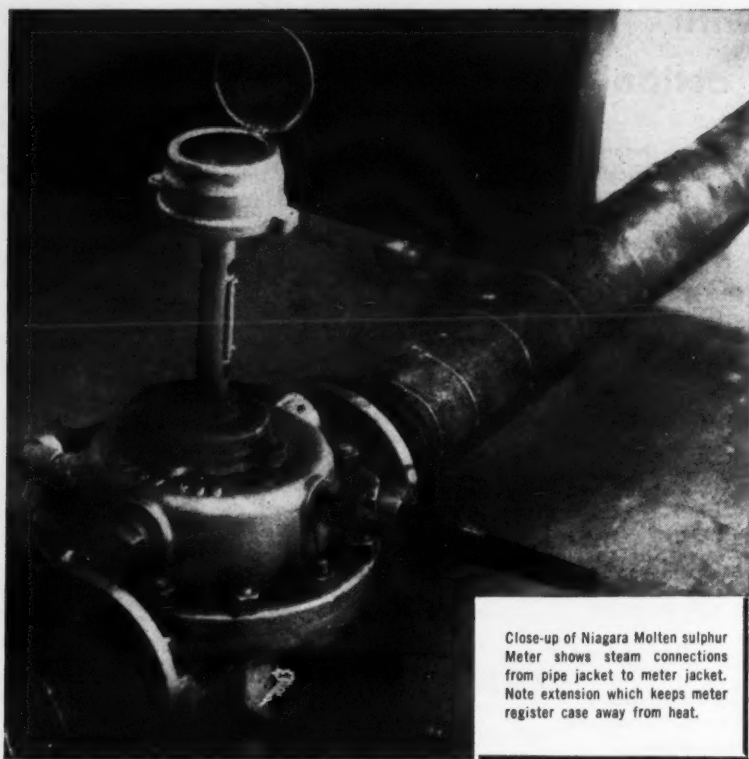
*Trade-Mark



Taylor Instruments **MEAN ACCURACY FIRST**

Check 2271 opposite last page

For the difficult Liquid Metering Problems Use Niagara Meters



Close-up of Niagara Molten sulphur Meter shows steam connections from pipe jacket to meter jacket. Note extension which keeps meter register case away from heat.

● Niagara displacement type liquid meters have a surprising range of applications. Their ultra-simple design, and variations of materials enable them to operate under most difficult conditions.

For example:

In the production of sulphuric acid it is desirable to measure the amount of sulphur fed to the burners so that the efficiency of the process can be checked. A Niagara Meter with a steam-jacketed cast iron casing and stainless steel working parts was selected for the job.

Since April of 1955 more than two million gallons of lime neutralized and filtered, dark Louisiana sulphur have been metered at a rate of 560 G.P.H. . . . without a shutdown for repairs or maintenance.

There is a dependable Niagara Meter to meter almost every liquid including caustic soda, sulphuric acid, soap, petroleum products, fruit juices, calcium chloride, alum and many others. The Niagara water meter line is standard for cold or hot water measurement.

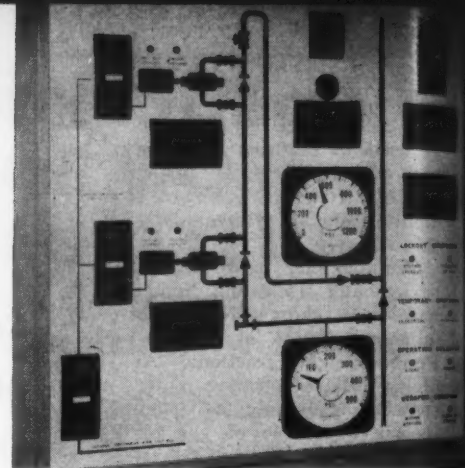
Please send me information on Niagara
Chemical Meters.

Liquid.....
Flow g.p.m.....Temp.....
Name.....
Company.....
Address.....

**BUFFALO
METER COMPANY**
INCORPORATED
2892 Main Street
BUFFALO 14, NEW YORK

Check 2272 opposite last page

Mimic of Silver Plains station's flow pattern, and control, alarm, and monitoring systems are contained in control console at Gretna initiating station



For completely unattended Silver Plains pumping station, dependability is important. Operating experience has proven that . . .

Electronic-Electrohydraulic Provides Close, Dependable

THEODORE W. WETT, Associate Editor
with B. H. MACKENZIE and A. R. MURDISON
Pipe Line Div., Imperial Oil Limited, Toronto, Canada

Tight, stable, dependable flow control has been achieved at Winnipeg Pipe Line Company Ltd.'s Silver Plains pumping station by utilizing an electrohydraulic actuator on main control valve. Actuator combines with electronic controllers for continuous monitoring of pipe line flow in completely unattended pumping station. Installation operates on a controller proportional band setting of 10% with no tendency towards hunting or overshoot.

Silver Plains pumping station was commissioned on Feb. 12, 1957 as a booster station for originating station at Gretna. System handles crude and consists of approximately 73 miles of 10" line and 3.5 miles of 8" spur.

In choosing electrohydraulic actuator and electronic controllers the following advantages were obtained:

1. No air compressor or associated instrument-air drying system was needed. This eliminated troubles due to plugged or frozen air lines under

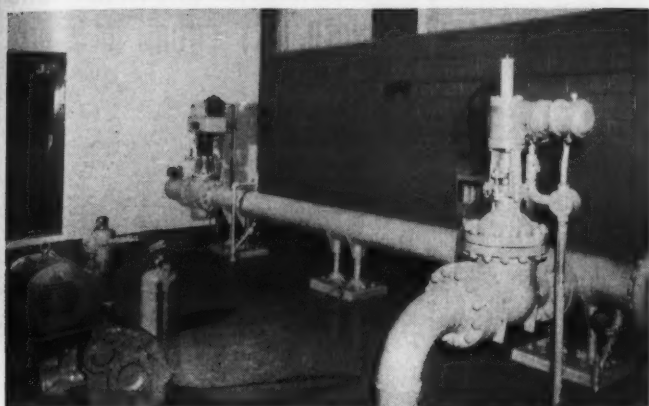
winter operating conditions.

2. Low maintenance (none has been required), and dependable operation.
3. Speed of action. A much better frequency response and phase shift characteristic of overall control loop result in tighter, more stable control.

Routine checks on entire control loop show that system is more stable and tends to remain in calibration better than any yet used by the company. Recalibration of instruments has not been found necessary over entire period of operation to date—nearly 16,000 hr. Tighter control is evidenced by 10% controller proportional band setting as contrasted to 40-50% proportional band settings normally expected with pneumatic instrumentation and actuators.

In operation of system, pressures are sensed by strain gages which generate electric signals. Temperatures are sensed by resistance bulb detectors. Vibration of pump

PROCESS INSTRUMENTATION and LABORATORY APPARATUS



Interior of Silver Plains pumping station. Discharge valve with electro-hydraulic actuator can be seen in background

System Flow Control

unit is monitored by moving coil pick-up. Temperature and vibration signals are fed to special protection units.

Signals from station suction and station discharge pressure amplifiers are fed to electronic proportional controllers. Output of controllers, plus output of a controller proportional to unit power, are fed to override adapter. Normally, signal from override adapter proportional to suction pressure will control throughput by actuating control valve. However, either of other two parameters, discharge pressure or unit power, can override and take over control.

Control valve is an equal percentage, V-port type. It is positioned by an electrohydraulic actuator.

Actuator functions as follows: Signal from controller, applied to a moving coil, positions a jet pipe to deliver hydraulic fluid to actuating piston, opening or closing valve. Piston rod is linked to coil by a feedback lever, feedback spring, and adjustment roller. Tension in feedback spring is changed as piston moves.

This change in spring ten-

sion equalizes force of coil acting on jet pipe to return it to neutral position when piston has brought valve to new setting. A change of input signal equal to 0.1% of full range, usually 4 ma, will result in a corresponding repositioning of valve.

Operation of Silver Plains station is remotely controlled from Gretna, Manitoba initiating station over a leased wire circuit. An illuminated mimic flow diagram and control, alarm, and telemetered functions are contained in control console at Gretna station.

(For more information on electronic proportional controllers and override adapter, contact Swartwout Co., 18511 Euclid Ave., Cleveland 5, O.)

Check 2273 opposite last page.

(Electrohydraulic valve actuator was supplied by GPE Controls, Inc., 240 E. Ontario St., Chicago 11, Ill.)

Check 2274 opposite last page.

(Pressure-sensing strain gages are a product of Baldwin-Lima-Hamilton Corp., 940 Simpson St., Eddyston, Pa.)

Check 2275 opposite last page.

15-to-1 Turn Down with Uniform Accuracy

NEW Kates TYPE "F" FLOW RATE REGULATOR



MORE ACCURATE —

Both in flow control and set point adjustment

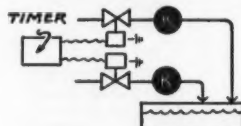
MORE ADAPTABLE —

For a wider variety of liquids and applications

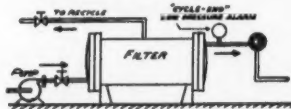
MORE FLEXIBLE —

With 15 to 1 turn down

TYPICAL APPLICATIONS



Batch process measurement



Pressure filtration control

A 15-to-1 "turndown" with a twist of a dial is now possible with the all-new, improved TYPE "F" Regulator—a direct-acting, self-contained unit that automatically measures and controls fluid-flow regardless of variations in supply or discharge pressures. Quickly and easily installed, it performs all the functions of a complete fluid-flow control system. Set the desired flow rate on the direct reading, uniformly graduated 160° dial... then forget it! The TYPE "F" Regulator does the rest. Kates TYPE "F" Regulators offer greater accuracy, handle a wider range of liquids with greater stability, yet faster response than ever before! Economical—their ultra-simple design, rugged construction features mean longer life, less service needs. Standard units are rated from 0.02-0.20 to 100-550 GPM. Special units can be supplied for unique applications.

DON'T BUILD A SYSTEM —

INSTALL A



Get full details and description—
write for New Bulletin No. 581

THE W. A. KATES COMPANY

Department O
430 Waukegan Road
Deerfield, Illinois

Check 2276 opposite last page



MODEL ST-FM

NEW

SCAMMIT

STATIC-SWITCHING MONITORING SYSTEMS

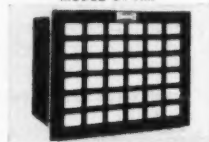
*Self-Contained . . . Expandable
Lower Cost . . .
Minimum Maintenance
Range of Models and Sizes*

You can now get greater reliability for all kinds of process and automation control in these new SCAMMIT MONITORING SYSTEMS. Components are permanent and static switching circuitry eliminates most component failure; result is years of economical and dependable alarm protection. Investigate SCAMMIT before you invest in any monitoring system.

SEND FOR complete information and literature.



MODEL ST-AM



MODEL ST-LF



MODEL ST-EM

SCAMMIT[®] INSTRUMENT CORP.

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Dept. K.

COMPLETE MONITORING SYSTEMS FOR INDUSTRY
REPRESENTATIVES IN ALL PRINCIPAL CITIES

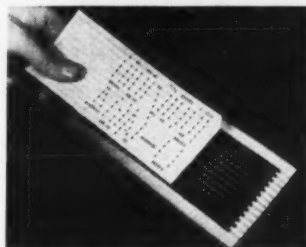
Check 2277 opposite last page

INSTRUMENTS & LAB

Diode function performed by photorectifiers in computers

Photorectifier plates have been developed for use in conjunction with any punched card system. It is anticipated that plates will extend range and increase flexibility of digital-computer systems.

Single unit is equivalent to conventional diode network. It requires virtually no soldering. Photorectifiers operate



Photorectifier plate behaves essentially like array of diodes

only when illuminated. This permits activation of required networks by masking techniques.

(Rex-Arrays are product of Rex Corporation, West Acton, Mass.)

Check 2278 opposite last page.

Pressure-difference switch reveals filter clogging

Uses: Sensing difference between two pressures.

Features: Unit is suitable for filter installation. When filter becomes clogged, pressure difference across inlet and outlet is sensed by switch which actuates warning circuit.

Description: Unit is constructed to sense pressure differences of 5 to 140 psi. Sealed-piston sensing element actuates electric circuit upon increasing or decreasing of a predetermined pressure difference.

Switch is applicable to oil systems of 50- to 6000-psi working pressure. High proof-pressure rating of 9000 psi gives protection against damage from sudden surges and

HANDY SELECTION GUIDE GIVES ROTAMETER SPECIFICATIONS WITH JUST A TURN OF A DIAL



**It's yours for the asking
. . . from Brooks**

Here is a quick, convenient way to compare rotameter specifications to find the correct model for any particular application.

With the Brooks Rotameter Selection Guide, you can determine essential information at a glance. You simply set the chart dial at the required flow range, and other pertinent data—model, size, maximum operating temperature and pressure—are conveniently presented.

The Guide covers the full line of Brooks Rotameters . . . a line that includes everything from rugged armored meters for large flows, high temperatures and pressures, to "miniature" purge meters for small flow indication.

All in all, you'll find the Selection Guide a genuinely useful reference manual. To get a copy, request Bulletin 110.

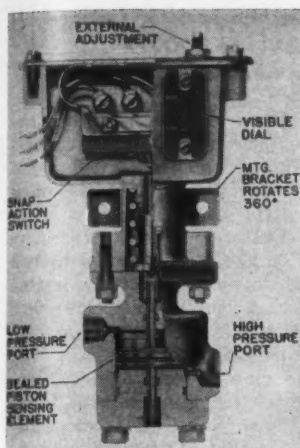
BROOKS ROTAMETER COMPANY



659 A STREET
LANSDALE, PA.

S.A. 1958

Check 2279 opposite last page
CHEMICAL PROCESSING



Warning circuit is actuated by pressure-difference switch in case of filter clogging

shock loads.

Field setting is simplified by means of external adjustment screw and visible dial. Fixed actuation value of switch (pressure-difference change to reset) is 5 to 15 psi, depending on working range of system.

(Pressure-difference switch is product of Barksdale Valves, 5125 Alcoa Ave., Los Angeles, Calif.)

Check 2280 opposite last page.

Vacuum laboratory oven has even heating

Uses: Drying and treatment of heat-sensitive materials.

Features: Heaters in unit are placed on all sides of chamber for constant uniform temperatures.

Description: Vacuum oven has square-cabinet design, so that entire interior is utilized for work space. Valves are side mounted to permit units to be stacked conveniently.

Two models are available with temperature ranges of ambient to 200 and 300°C. Chamber is capable of evacuation to one micron, when equipped with pump of adequate size.

(Vacuum oven is product of The Electric Hotpack Co., Inc., Cottman Avenue at Melrose St., Philadelphia 35, Pa.)

Check 2281 opposite last page.

Tune up furnaces with dashboard simplicity Using a Bailey HEAT PROVER Analyzer

• For fast accurate combustion analysis, compare this portable unit to Orsat measurements: It tells you **what's happening** as you make furnace, kiln, or engine adjustments, **not what happened!** No guessing, no spot readings to average. Simple, convenient to use.

The continuous readings from a Bailey HEAT PROVER Analyzer enable operators to correct combustion variables before costly losses are incurred. The two meters on the analyzer show per cent by volume of oxygen and combustibles on either a 20% range span or a more sensitive 4% range. Temperature of the gases in degrees Fahrenheit may also be shown.

To order or get additional facts, write us direct or contact any of our District Offices. You'll find them listed in Chemical Engineering Catalog, Refinery Catalog, Thomas Register, or Mechanical Catalog.



Gas analysis with Bailey HEAT PROVER Analyzer at a process heater. Per cent oxygen and combustibles is shown continuously while testing.

CPI06-1

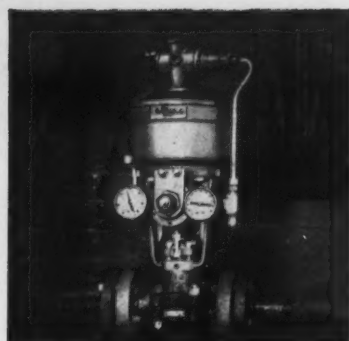
Chemical and petroleum division
BAILEY METER COMPANY

1074 IVANHOE ROAD • CLEVELAND 10, OHIO

In Canada—Bailey Meter Company Limited, Montreal



Check 2282 opposite last page



"Best valves we ever found for tight shutoff on our maleic acid lines" says Instrument Foreman of a well-known mid-west chemical plant.

YOU CAN COUNT ON

CONOFLOW LB CONTROL VALVES

FOR TIGHT SHUTOFF

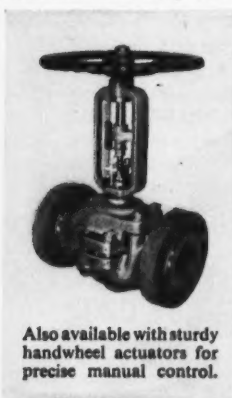
Major chemical companies have switched to Conoflow Series LB Control Valves because they provide absolute tight shutoff, regardless of operating variables. Tight shutoff prevents waste of costly liquids and gases... insures precise process control.

The answer is the single-seated body and the powerful cylinder actuator of the LB Valve. This integrated body-actuator design allows for leak-proof shutoff not possible with double-seated valves.

An added feature of the LB Valve is much lower all-around maintenance costs. Body separates easily at seat ring for tear down and inspection. Fewer replacement parts mean substantial inventory savings. Streamlined body contours and

extra thick walls assure longer life in corrosive and erosive services. Also, when it comes to special alloys... type 316 Stainless steel, Hastelloys, Monel, Nickel, Everdur, etc., the single-seated LB Valve offers a substantial initial cost advantage over double-seated construction. By all standards, your overall cost is much less for a Conoflow Series LB Valve.

If you are not already a user, try a Conoflow LB Control Valve... and let it prove itself.



Also available with sturdy handwheel actuators for precise manual control.



Phone your nearest Conoflow representative (located in principal cities), or write to Conoflow Corporation, 2100 Arch Street, Philadelphia 3, Pa. for Bulletin LB-3-C.



INSTRUMENTS & LAB

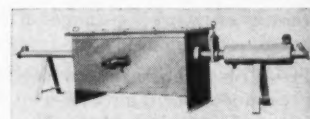
Carbon-resistor furnace heats to 5000°F in two hours

Uses: High-temperature research, fabrication of natural and synthetic minerals, and graphitization of coke-pitch mixtures.

Features: Temperatures to 5000°F can be reached in two hours and uniformly maintained throughout heated length of furnace.

Description: Furnaces can be closely controlled to provide even temperatures in all ranges. Fully automatic saturable-reactor-type control system can be supplied for close control of temperatures. Manually operated controls are available for use with externally mounted optical pyrometer.

Gates on both ends of heated zone minimize radiation loss into charge chamber and cooling chamber. Termi-



Gates on both ends of heated zone minimize radiation losses into charge chamber and cooling chamber in carbon-resistor tube furnace

nal contact losses are eliminated by machined fit of graphite terminals to graphite heating tube.

Thermostatic interlock on water-cooled terminals shuts off power supply in event of water failure. This prevents overheating of terminal connections. Valves on both ends of heating chamber minimize entrance of air. Explosion-relief doors on both ends of furnace prevent build up of dangerous pressures.

Cover is removable to provide easy access to graphite tube. Terminals lead through side of furnace. Plug and ring-gage fit between terminals and heating tubes simplifies replacement.

(Carbon-resistor tube furnaces are product of Hevi-Duty Electric Company, Milwaukee 1, Wis.)

Check 2284 opposite last page.

ConoControls®

CONOFLOW CORPORATION
FOREMOST IN FINAL CONTROL ELEMENTS



Check 2283 opposite last page



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If you have, you will want to make sure that your copy of **CHEMICAL PROCESSING** will continue to come to you on time.

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you have received a promotion and have been transferred to a new location.

Or, if you have changed your affiliation, we want to make sure that your copies of **CHEMICAL PROCESSING** will follow you.

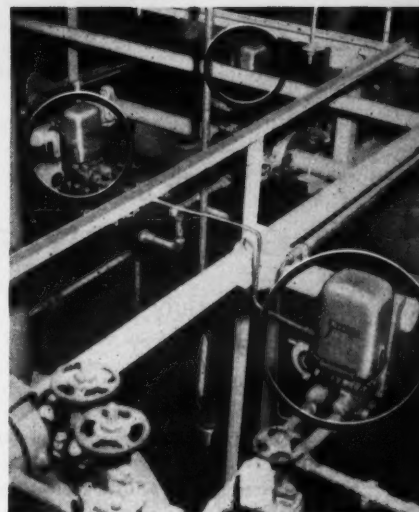
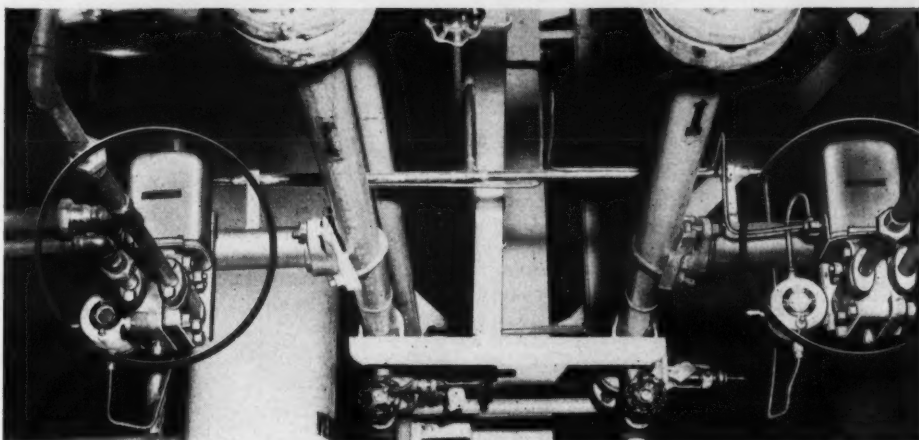
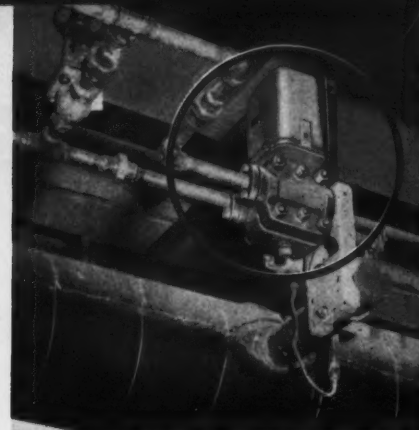
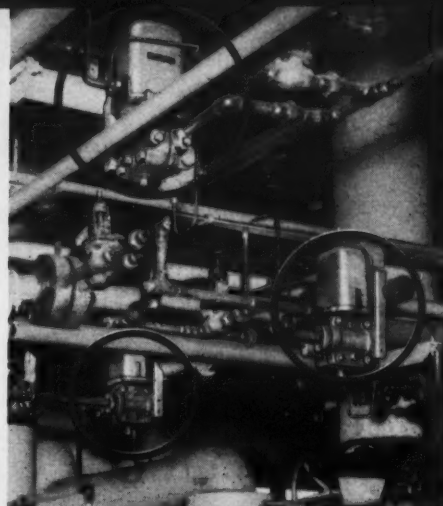
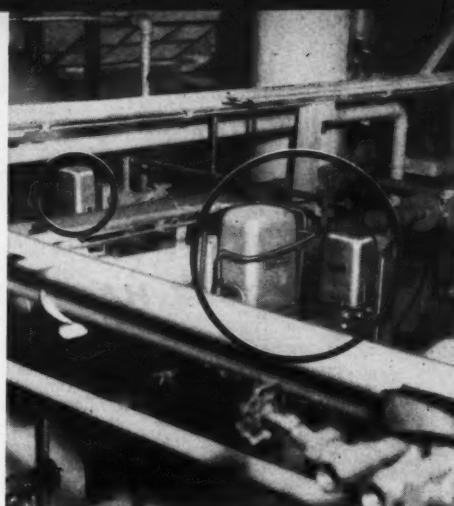
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the slip opposite the back cover. Be sure to answer all questions regarding your new location, title, and company.

In addition, give us your former address, including company, city, state.

Mail this slip to the Reader Service Department and we will make sure you will continue to receive each issue of the magazine promptly.

For more information on product at right, specify 2285 see information request blank opposite last page.



A few of the more than 100 Foxboro d/p Cell Flow Transmitters installed at Missouri Chemical Works of Hercules Powder Company, Louisiana, Missouri.

Hercules' Missouri Chemical Works reports:

**"Foxboro d/p Cells*
always accurate...
never need re-calibration"**

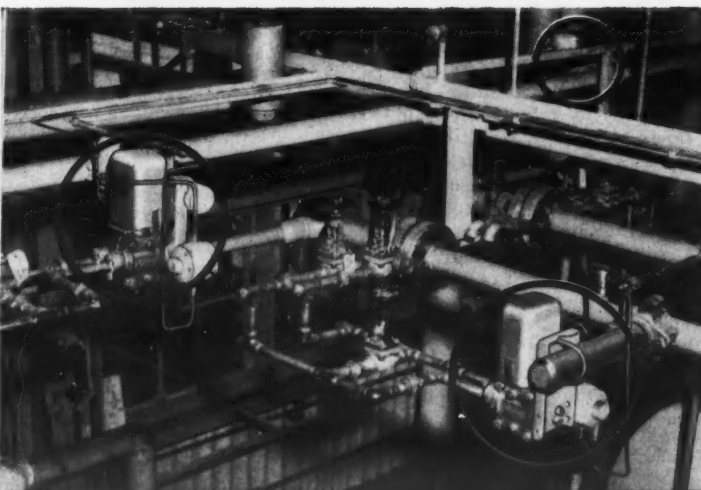
At Hercules Powder Company's 540-acre Missouri Chemical Works, there are over 100 Foxboro d/p Cell Transmitters in operation today — providing high-speed flow measurement and transmission throughout the ammonia, formaldehyde, methanol and pentaerythritol plants.

"Reliability is the big thing," according to Hercules instrument engineer J. J. VanShaik. "We can install a Foxboro d/p Cell and forget it. Once it's calibrated, we know it'll stay that way. We never even stock spare parts."

Hercules especially likes the Foxboro d/p Cell for flow control. "Gives us closer control," says instrument engineer H. McCombie. "Eliminates one possible source of inaccuracy and maintenance trouble in the control loop."

Let Hercules' experience be your experience — with Foxboro d/p Cell Transmitters as the basis for your control system. Write for full details in Bulletin 13-11A. **The Foxboro Company, 816 Neponset Avenue, Foxboro, Massachusetts.**

* Reg. U. S. Pat. Off.



FOXBORO
REG. U.S. PAT. OFF.
FIRST IN FLOW

From WESTON—



The NEW '4,000 SERIES'

These Heavy Duty Bimetal
Thermometers Offer
7 Points of Distinction:

- All-stainless construction—including welds.
- In-line scales and pointers eliminate parallax error.
- Removable bezels permit easy window replacement—even in the field.
- New composition gaskets protect against "breathing" and leakage.
- Accuracies of $\pm 1\%$ of range are assured.
- External adjustment feature (located at side of case) is standard equipment.
- Full line of sizes, stem lengths and ranges.

3-inch and 5-inch diameter heads... back and bottom connected models with rotatable scales... ranges cover an area from -100° to 1000° F. or -100° to 500° C. ... stems up to 72" available.

For full information and name of stocking distributor, contact your local Weston representative... or write to Weston Instruments, Division of Daystrom, Inc., Newark 12, N.J. In Canada: Daystrom Ltd., 840 Caledonia Rd., Toronto 19, Ont. Export: Daystrom Int'l., 100 Empire St., Newark 12, N.J.

WESTON



Bi-metal Thermometers

WORLD LEADER IN MEASUREMENT AND CONTROL

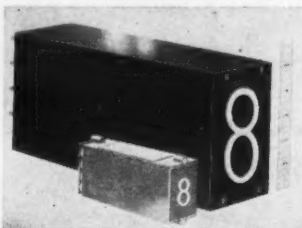
Check 2286 opposite last page

INSTRUMENTS & LAB

Readout display unit viewed at 100 feet

Uses: In process, production, and supervisory control panels, display boards, and equipment tests.

Features: Size of numbers and/or characters appearing



Character size in display is $3\frac{3}{4} \times 2"$

on viewing screen permit viewing at 100' range.

Description: Character size is $3\frac{3}{4}"$ high $\times 2"$ wide. Characters are available in colors and variety of styles. Body case is constructed of aluminum. Overall unit size is $3\frac{1}{4} \times 11\frac{1}{2}"$.

(In-line display is product of Industrial Electronic Engineers Inc., 3973 Lankershim Blvd., North Hollywood, California.)

Check 2287 opposite last page.

Accuracy of flowmeter remains unaffected by viscosities

Insertion into filter housing permits spot check

Uses: Measurement of fluid-flow rates.

Features: Viscosity of fluid may vary from 100 to 750 SSU without having any effect on meter accuracy. Mechanism may be inserted into filter housings to spot check fluid-flow rates.

Description: Variable-orifice type flowmeter consists of meter cartridge (sliding piston mechanism) and housing. Entire flow passes through variable orifice at end of piston.

To measure flow, opening is closed down to cause different pressure to exist on either side of orifice. Pressure drop activates piston in direction of

LONG-TERM ACCURACY IN A LOW-COST FLOWMETER?

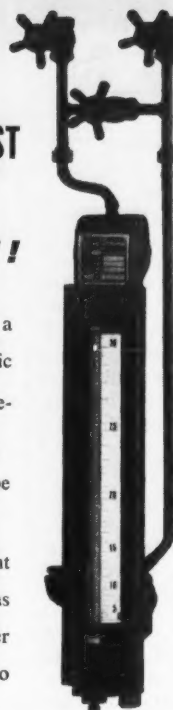
MERIAM HAS IT!

Long-term accuracy is part and parcel of a Meriam Flowmeter. For a Meriam Flowmeter operates on the inherently accurate manometric principle.

It's also a simple device: no pressure-tight bearings, no magnetic followers, no calibration problems.

With the orifice installed in the pipeline, the flowmeter can be located at almost any convenient reading location.

The Type H Flowmeter, shown here, is a rugged, all-steel instrument that will handle pressures to 250 psig, differentials to 160" water. It has no moving parts, is easy to install, requires little maintenance. Other models share these virtues, too; the largest are made for pressures to 1000 psig, differentials to 800" water. Request Bulletin 18-A.

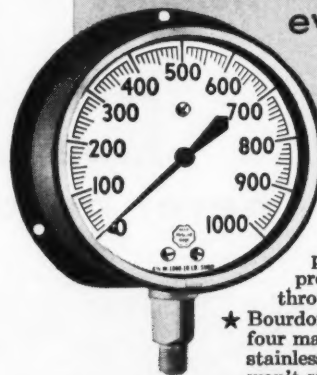


The MERIAM Instrument Company

10920 Madison Avenue, Cleveland 2, Ohio

Check 2288 opposite last page

Helicoid Gages give Sustained Accuracy, even on the toughest jobs



★ Exclusive Helicoid movement has no gears, no teeth. Shock-proof construction protects accuracy through millions of cycles.

★ Bourdon tubes available in four materials—bronze, steel, stainless steel, and K Monel—won't stretch, crack, or leak.

★ Six cases, including new solid-front safety case, meet every mounting requirement.

★ External pointer adjustment can't be jarred out of position.

★ A complete selection of gages and accessories for hydraulic, chemical, and other service.

Write for Catalog G-52.

HELICOID GAGES

Helicoid Gage Division

American Chain & Cable Company, Inc.

929-P Connecticut Avenue • Bridgeport 2, Conn.

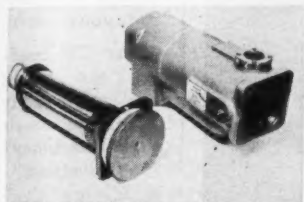


Check 2289 opposite last page

CHEMICAL PROCESSING

flow, and against spring which holds it outward. Movement is indicated by mechanically actuated pointer.

When piston is being held in equilibrium between differential pressure and spring, a predetermined amount of



Variable-orifice type flowmeter may be inserted into existing filter housing to spot check fluid-flow rates

pressure drop exists. Rate of flow is then read from graduated control wheel in gallons per minute.

Flowmeter is available in size capacities of 10 to 200 gpm. Instruments are adequate for service to 5000 psi.

(Tell-Tale flowmeter is product of The Rosaen Company, 1776 E. Nine Mile Road, Hazel Park, Mich.)

Check 2290 opposite last page.

Process-analyzer recorder uses no batteries

Uses: Analysis based on detection of refractive index differences between a process stream and a desired sample.

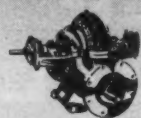
Features: Recorder, based on repeater principle, operates without batteries and standard cell. This saves time normally required for zero control and recalibration.

Description: Null-type process analyzer may be supplied with electric or pneumatic proportional controller.

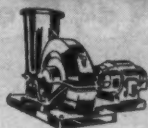
Various sensitivities are available. Analyzer can be furnished with mass or volume collecting system, replacing synchronous chart drive on recorder.

(R. I. process analyzer is product of Phoenix Precision Instrument Company, 3803-05 N. Fifth St., Philadelphia 40, Pennsylvania.)

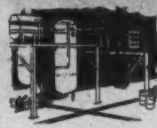
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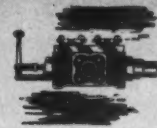
PUMP CONTROL



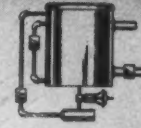
SPEED AND AIR FLOW CONTROL



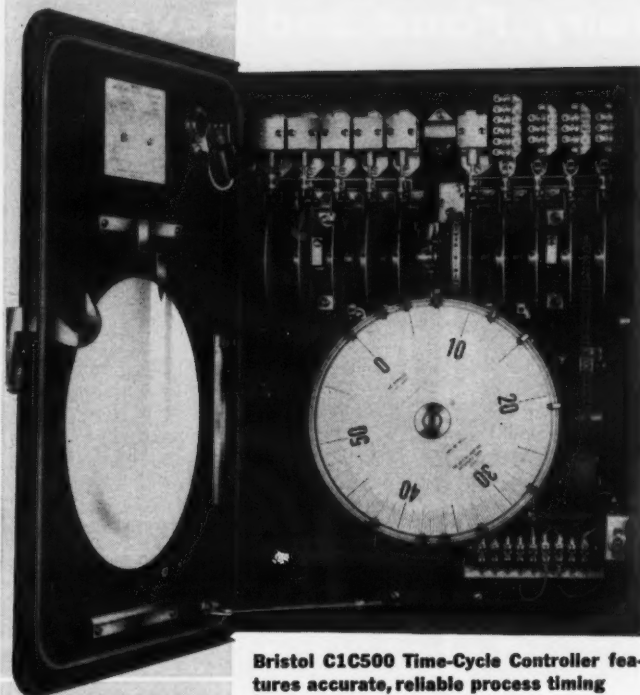
SHUTTING DOWN A PROCESS



OPERATING HYDRAULIC VALVE



OPENING AND CLOSING MOLDS AND RETORTS



Bristol C1C500 Time-Cycle Controller features accurate, reliable process timing



PISTON OPERATOR



OPERATING LARGE VALVES



DAMPER REGULATION



STARTING AND STOPPING MOTORS

improved automatic process time-cycle controller

... the key to process automation

BRISTOL ... for improved production through measurement and control
AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

Plant processes that depend on the timing of such operations as those graphically represented here and many others can be put under exact control with Bristol Process Time-Cycle Controllers.

Bristol Automatic Time-Cycle Controllers are the result of over forty-five years of pioneering research and development in timing industrial process operations. Thousands of these controllers have been built for use in manufacturing a wide variety of products, such as rubber goods, molded plastics, dry ice, tires, coffee, tobacco, chemical products, rayon, dyeing of woolen goods, and many others.

The Model C1C500 Cycle Controller operates on the same basic principle as that used in previous models. However, the improved model has a number of design refinements that simplify it and make it more flexible to apply and more convenient to use.

Number of Operations That Can Be Timed: Up to ten process-variables can be controlled by either pneumatic pilot valves or electric pilot switches. Each valve or switch can be operated up to 24 times during a complete cycle. Timing cam easily adjustable. This feature gives increased versatility and broadens the controller's application in the processing industry.

PILOT VALVES OR PILOT SWITCHES: Pneumatic and electric pilots are easily interchangeable by the user—great versatility of application.

Pneumatic Pilots are high-capacity valves.

Electric Pilots—single-pole and double-pole double-throw switches offered—15 amp capacity.

TIMING DISCS are of heavier and improved design for precision timing and ease of setting up a time schedule or changing an existing one. Ranges of from 0 to 15 minutes to 0 to 360 minutes are available.

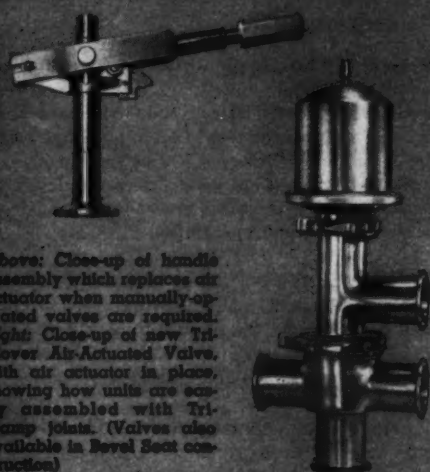
THREE ADDITIONAL AUXILIARY SWITCHES available for operating only once during a cycle.

If you have operations in your plant that must be carried out according to a definite and accurate time schedule, we invite you to investigate this valuable control instrument. Our engineers have had long experience in the application of Automatic Process-Timing Controls in practically every industry. They're ready to work on your problem now. Write today for our Bulletin C305. The Bristol Company, 141 Bristol Road, Waterbury 20, Connecticut. ☎ 7

Check 2292 opposite last page

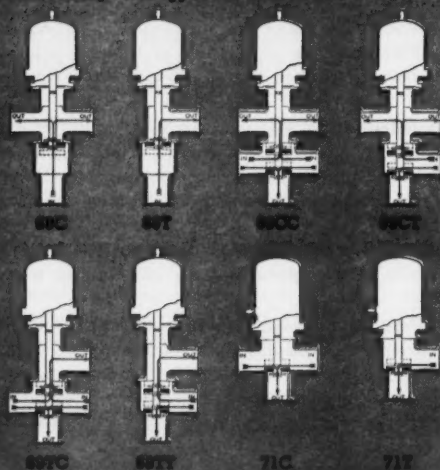
TRI-CLOVER VALVES

to meet a wide range of
Dairy, Food and Beverage
processing operations



Above: Close-up of handle assembly which replaces air actuator when manually-operated valves are required. Right: Close-up of new Tri-Clover Air-Actuated Valve, with air actuator in place, showing how units are easily assembled with Tri-Clamp joints. (Valves also available in Bore Seal construction)

The drawings below show the various Tri-Clover Air-Actuated Valve arrangements available. The black arrows show inlet and outlet ports when the plug is in the "UP" position. Inlets and outlets when the plug is lowered to the "DOWN" position are indicated with the green arrows. Valves are available in 1½" and 2" O.D. sizes as standard. Data on sizes up to 4" available on application. (Note that both single-acting and double-acting valve types are available.)



TRI CLOVER

LADISH CO.
Tri-Clover Division
Kenosha Wisconsin

IN CANADA: Bramford, Ontario
EXPORT DEPT.: 8 South Michigan Ave.,
Chicago 2, U. S. A. Cable: TRICLO, Chicago



Tri-Clover Division's Air-Actuated Sanitary Valves permit easy application of automation and automatic control to many phases of processing and cleaning operations in the dairy, food, and beverage industries. These efficient, air-actuated valves can be locally controlled . . . or remote-controlled from any plant area. Advanced design makes them ideal for use in completely automated installation, such as recirculation operations for in-place cleaning . . . or in a single operation, such as on a filling machine. Manufactured from type 304 stainless steel, these efficient, remote-controlled valves offer fast, positive liquid flow control in any line location, with accurate local or remote control.

Built to extremely high sanitary standards, Tri-Clover Air-Actuated Sanitary Valves assure maximum uninterrupted flow, with a minimum of agitation and friction.

For full details, write for Bulletin A-658, or see your nearest Tri-Clover Distributor.

WHAT DO YOU THINK?

Opinions and comments on the significant subjects carried in each month's **CHEMICAL PROCESSING** are important! We welcome your letters expressing your views.

Many CP readers are taking the opportunity to state their views on today's top questions.

By publishing your letters in **CHEMICAL PROCESSING**, others will have the opportunity to hear your side.

Perhaps you agree

with what has been written in these articles.

Maybe you don't.

You might even have a thought or angle which wasn't expressed.

If so, why not let us and others hear your ideas? Suitable letters will be published in our regular "Letters from Readers" column. (See page 7.)

Address your comments to:
The Editor
CHEMICAL PROCESSING
111 E. Delaware Place, Chicago 11, Illinois

For more information on product at left, specify 2293 see information request blank opposite last page.



Combating Corrosion with Chlorinated Polyether Plastic

Field application data show that material has successfully withstood
a variety of chemicals under a wide range of operating conditions

C. S. MILLER & J. B. MARTIN
Hercules Powder Co., Inc., Wilmington, Del.

Chlorinated polyether plastic, known as Penton, is proving to be a potent weapon in the arsenal available to the corrosion engineer. Field testing of material in valves and other types of processing equipment has shown it to give satisfactory service under severe operating conditions.

Accompanying Fig 1 shows an injection-molded, Penton-lined, cast iron, flange-body diaphragm valve installed in a plant. This valve is mounted above a glassed-steel vessel used for a hydrocarbon chlorination. Exposure is to CCl_4 , HCl , and wet Cl_2 at temperatures from 95 to 185°F. Valve has been in service since September 1955 and is still in good condition. Adjacent piping and valves are of porcelain, Havg, Pyrex brand glass, and glassed steel.

Fig 2 shows an injection-

molded, Penton-lined, cast iron body, Y-type globe valve installed in a storage tank area for use in 32% HCl at ambient temperatures. It was removed from service after two years and eight months because a gasket leak at one flange resulted in the destruction of the outside metal. Lining showed no change and, except for the area where the flange metal was gone, showed full adhesion to metal body of valve.

Cast steel tee shown in Fig 3 was flame-spray, chlorinated polyether-coated inside and out. It and another similar tee are installed on bottom outlet nozzles of glassed-steel chlorination vessels. Chlorine is introduced to carry out reaction through one porcelain valve and hot product is discharged through another on each vessel. Tees have given

trouble-free service for more than six months.

In another installation a fabricated steel flanged tee, with a whirl-sintered Penton coating, was used. This tee was installed in a mixture of weak acetic acid and ethyl acetate at 86°F. Interior coating was still in good shape after two years as shown by a recent inspection.

In addition to its chemical inertness, the chlorinated polyether has a number of other valuable properties. Material has successfully withstood operating temperatures of 250°F or higher. It has low water absorption, low permeability, good abrasion resistance, and high dimensional stability. It can be easily molded, heat formed, welded, and machined. Plastic shows remarkable adhesion to hot

metals. Bond is not lost even when contacted by corrosive products.

(Condensed from technical paper, "Combating Corrosion with Penton — Chlorinated Polyether," which was presented at the Annual Meeting of the National Association of Corrosion Engineers in Chicago in March 1959.)

(Penton plastic is product of Hercules Powder Co., Inc., Wilmington 99, Del.)

Check 2294 opposite last page.

(Penton-lined diaphragm valve is product of Hills-McCanna Co., 4570 West Touhy Ave., Chicago 46, Ill.)

Check 2295 opposite last page.

(Penton-lined, Y-type globe valve is product of The Wm. Powell Company, Cincinnati 22, Ohio.)

Check 2296 opposite last page.

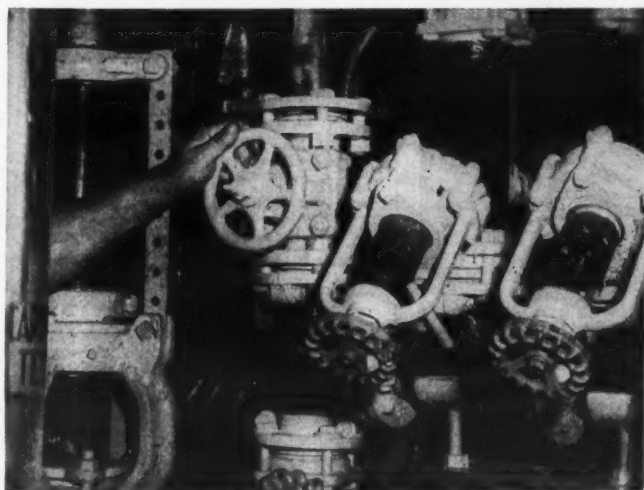
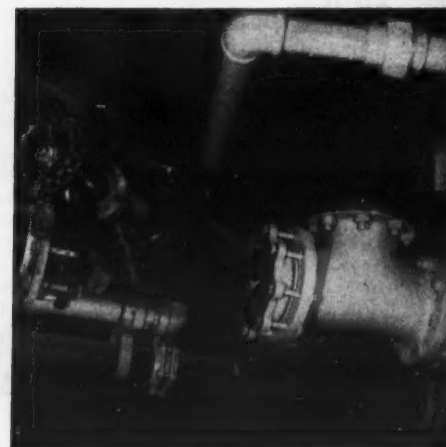


Fig 1 — Penton-lined diaphragm valve (left) has withstood CCl_4 , HCl , and wet Cl_2 at temperatures to 185°F for three years

Fig 2 — Y-type globe valve, lined with chlorinated polyether plastic, in 32% HCl service



Fig 3 — Flame spray, Penton-coated steel tee in service under a chlorination reactor



here's real **ECONOMY...**
time-saving **SIMPLICITY...**
and **DEPENDABILITY**
sure-fire

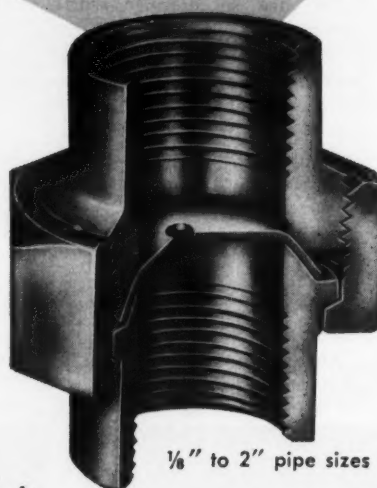
for metering, measuring, controlling
any piped material!



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Cup-Orifice Plate
will convert any
standard
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GASKETLESS ORIFICE UNION

- ELIMINATES the necessity of expensive gaskets!
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PLUS

Catawissa's
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FACTOR** — and **GUARANTEE** of complete satisfaction!

Orifice Union problems of the past are gone forever! Stainless or carbon steel cup-orifice plate (blank or drilled) easily, quickly, securely fits into place between union head and tail pieces to form a good, tight, leakproof seal! Temperature and pressure requirements are restricted only by the rating of the union itself (3000-lb. service, 9000-lb. test)!

Just specify "Catawissa Cup-Orifice Plates" or "Catawissa Cup-Orifice Unions" at your favorite supply store — or write direct for catalog and complete information.

UNION SPECIALISTS
for
42 1917 1959
years

CATAWISSA VALVE & FITTINGS CO.
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Check 2297 opposite last page

CORROSION CONTROL

Next month...

CORROSION CONTROL TO BE FEATURED

The regular Corrosion Control section carried every month in **CHEMICAL PROCESSING** will be considerably expanded next month to include many special features.

Vital importance of corrosion technology in missile work and atomic energy will be highlighted in an article by Dowell's Guy Williams. Mr. Williams represents corporate membership on the Board of Directors of the NACE.

More Corrosion Keys, condensations of technical papers, and case histories on alloys, plastics, protective coatings, and cathodic protection will be included.

Look for the Spotlight on Corrosion Control in July CP.

Triple play in production— propylene to polypropylene to light strong rope

Rope proves to be superior in hawser applications

Uses: Industrial applications in cargo handling, barge towing, safety lines, and general-utility ropes.



Testing indicates that polypropylene rope does not pick up water or freeze.

Features: Test results indicate that rope does not pick up any water or freeze.

Description: Polypropylene ropes were installed on two

Highly Intimate Blends in 1 to 2 Minutes

Blends while discharging; No segregation or flotation

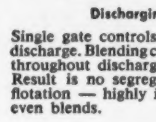
Sturtevant Rotary Blenders start 4-way blending while charging, continue it during discharge, thus producing highly intimate, even blends of dry and semi-dry materials — within 3 to 5 minutes of start of charging.

Six complete blending cycles per hour are common. And Sturtevant's special action produces no particle reduction, cleavage or attritional heat — is highly effective yet gentle and safe even with explosives.



Receiving

Scoops cascade material as drum rotates. Movement forces material from both ends to middle. Thus blending is 4-way right from start of charging.



Discharging

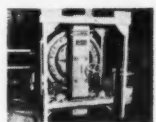
Single gate controls charge, discharge. Blending continues throughout discharge phase. Result is no segregation or flotation — highly intimate, even blends.



Self-cleaning, dust-sealed drum; one-man accessibility

Operation of Sturtevant Blenders is self-cleaning — drum interiors are completely dust-sealed. For inspection of all models, one man simply loosens a few lugs to remove manhole cover — quickly and easily.

Nine standard models with capacities to 900 cu. ft.



10 cu. ft. Sturtevant Blender at U.S. Steel Corp.'s new Applied Research Laboratory (Raw Materials Division) in Monroeville, Pa. This unit handles batches up to 500 lbs. — is ideal for pilot work and small runs.



One of four 450 cu. ft. Sturtevant Blenders at Celriver Plant of Celanese Corp. (Rock Hill, N. C.). These large units handle up to 20,000 lbs. batches — have a 9-year record of meeting the most exacting blending requirements.

Fully or semi-automatic, or manually controlled operation

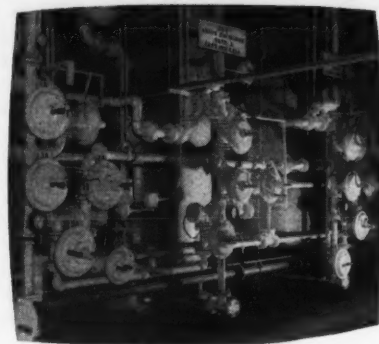
Constructed of carbon steel, stainless steel or Monel metal, Sturtevant Rotary Blenders are engineered to fit each customer's needs — can be supplied with injector sprays and any desired control system.

For more on Sturtevant Blenders, request Bulletin No. 080B. (Bulletins also available on Mixers, Air Separators, Micronizers, Crushers and Grinders.) Write today. STURTEVANT MILL CO., 119 Clayton St., Boston, Mass.

Check 2298 opposite last page

CHEMICAL PROCESSING

THESE NEW IDEAS HAVE COME FROM



Illinois Water Treatment Co. was incorporated over 20 years ago to use the newly-discovered resins in the development of ionXchangers.

1942 By this time, IWT had already built more than 50 successful multi-bed ionXchangers (some of which are still in use today).

1943 IWT brought "automation" to ionXchange with the introduction of automatic ionXchangers, some of which were very large. (Some of these are still operating today, also.)

1947 This was also the year when IWT brought out the first large (400 gpm) ionXchanger for silica removal.

1949 IWT built the first commercial Mixed Bed ionXchanger.
(U.S. Patents 2605084 2771424)

1954 A huge 5,000 gpm fully-automatic mixed-bed ionXchanger was designed and built by IWT to remove silica from make-up water for high-pressure boilers. This plant has now de-ionized over SIX BILLION pounds of water.

1957 IWT introduced "Counterflow," the first really new idea in multi-bed ionXchangers since the introduction of silica-removal techniques. (Patent pending.)

THIS EXPERIENCE CAN MEAN A LOT TO YOU

These ideas, and other IWT developments, can mean reduced costs, improved operations, and greater efficiency in your plant. Check with your IWT representative.

ILLINOIS WATER TREATMENT CO.
840 CEDAR ST., ROCKFORD, ILLINOIS
NEW YORK OFFICE: 141 E. 44th St., New York 17, N.Y.
CANADIAN DIST.: Pumps & Softeners, Ltd., London, Ont.

Check 2299 opposite last page

CORROSION CONTROL

tankers for testing as hawsers. They proved superior to conventional hawsers in strength, handling characteristics, and rot resistance. A length of this hawser weighs only 40% of the weight of same length of manilla hawser of equivalent strength.

(Polypropylene rope is manufactured by American Manufacturing Company, Utess, Noble, and West Streets, Brooklyn 22, N.Y.)

Check 2300 opposite last page.

(Polypropylene is supplied by Hercules Powder Company, 917 Market St., Wilmington 99, Del.)

Check 2301 opposite last page.

(Propylene is supplied by Sinclair Petrochemicals, Inc., Subsidiary of Sinclair Oil Corporation, 600 Fifth Ave., New York 36, N.Y.)

Check 2302 opposite last page.

Fusion-welded Teflon raises size limits

Economical fabrication of one-piece lengths or configurations of Teflon is now possible through utilization of fusion-welding technique. Fusion weld is pure fluorocarbon with same heat, chemical, and electrical properties as Teflon.

This process removes many size limitations imposed by existing techniques and equipment. With fusion welding process, one-piece gaskets can be fabricated from two or more sections of Teflon instead of cutting from sheet stock.

Tests have indicated that tensile strength exceeds 2500 psi and elongation is over 200%. Material is available in thicknesses ranging from 0.015 to 0.375". Maximum length of straight-section weld is 5½", with curved-section welds slightly shorter.

(Further information concerning fused Teflon components may be obtained from United States Gasket Company, Plastics Division of The Garlock Packing Company, Camden 1, New Jersey.)

Check 2303 opposite last page.

Life in these excited states...

"Have you seen
the pipe inspector?"



How Ace keeps you out of the tight spots

We admire men who jump right into the tough problems, but our business is eliminating problems completely. That is, problems of corrosion and contamination in piping, valves, pumps, tanks, and the like. Good equipment keeps you always in the clear. Our 108 years of experience is at your service.

Ace chemical-resistant rubber-lined steel pipe best for high-pressure, big sizes, or abrasives. Pipe, fittings and valves 1½ to 24".



STRENGTH
OF STEEL

Highly efficient WE pump. Capacity to 360 gpm. Cast iron, fully protected by top quality, chemical resistant hard rubber lining.



BIG GIANT OF
ACID PUMPS

Design assistance and facilities for molding special fittings, pump parts, etc., of plastics or hard rubber. Also large hand-fabricating facilities.



CUSTOM MOLDED
OR HAND BUILT?

Variety and quality to match any plastic piping. Riviclor PVC, Ace-Ite rubber-plastic, Parian poly, Ace Saran, Tempron high temperature nitrile, hard rubber-lined steel.



Supermarket for
PLASTIC FITTINGS

ACE processing equipment of rubber and plastics

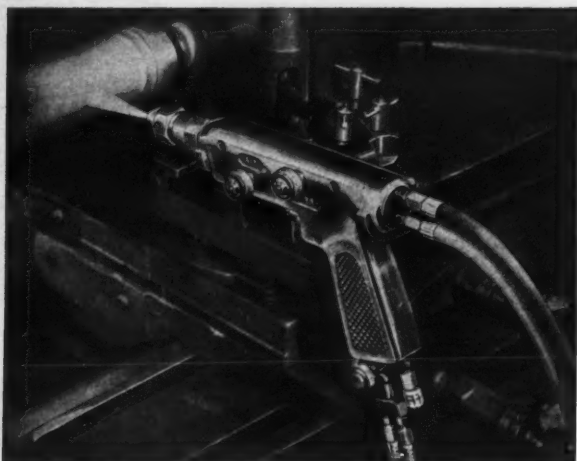
AMERICAN HARD RUBBER COMPANY
DIVISION OF AMERACE CORPORATION
Ace Road • Butler, New Jersey

ACE

See our pages
in
cee
Catalog!

Check 2304 opposite last page

STOP CORROSION

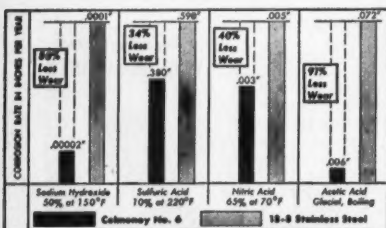


with Colmonoy Spraywelding

The superior corrosion resistance of Colmonoy No. 6 alloy makes it the ideal hard-facing material for use on surfaces undergoing metal-to-metal wear under corrosive conditions, such as pump and valve parts.

The Colmonoy Spraywelder puts No. 6 on fast, in powder form. It makes smooth overlays within .010" of desired size, requiring a minimum of finishing. Sprayweld overlays are solid and welded to the base metal.

The corrosion of vital process equipment parts becomes needless waste when the wear resistant qualities of Colmonoy No. 6 are combined with the economy and ease of the Spraywelder.



This table shows the comparative resistance to corrosion of Colmonoy No. 6 and 18-8 stainless steel. No. 6 is resistant to almost all caustics and acids. Ask for Engineering Data Sheet No. 3.

WRITE RIGHT NOW

For the Colmonoy Spraywelder Catalog and Hard-Facing Manual No. 79

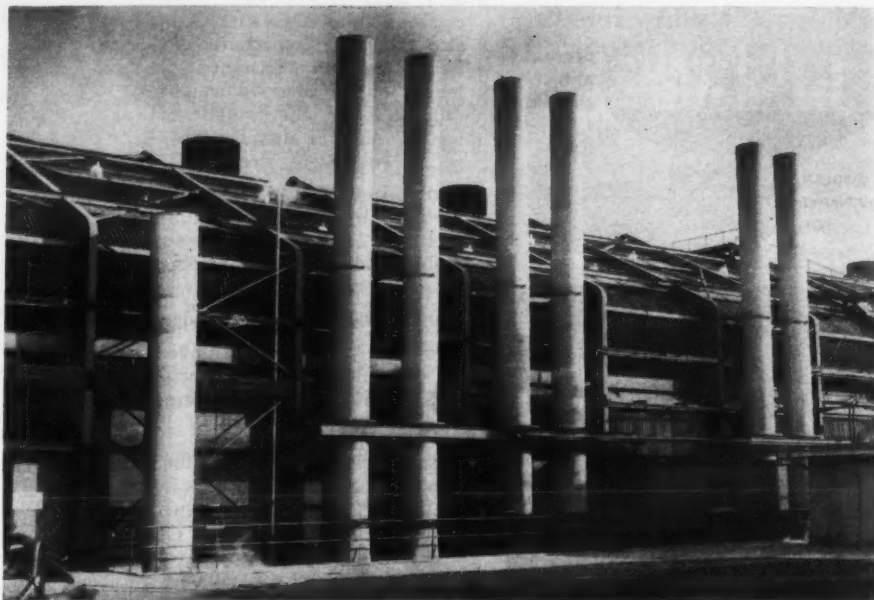
HARD-SURFACING AND BRAZING ALLOYS

WALL COLMONOY

19345 John R Street • Detroit 3, Michigan

BIRMINGHAM • BUFFALO • CHICAGO • HOUTON • LOS ANGELES
HICKORYVILLE, PA. • NEW YORK • PITTSBURGH • MONTREAL • GREAT BRITAIN

CORROSION CONTROL

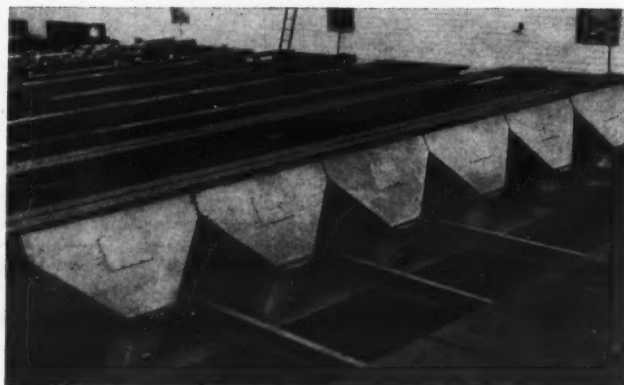


Fume removal system made of glass fiber-reinforced polyester resin . . .

Resists hydrochloric and hydrofluoric, nitric and sulfuric acids

GORDON WEYERMULLER, Associate Editor
with E. M. KLINE, General Manager
The International Nickel Company, Inc.
Huntington, West Virginia

PROBLEM: Corrosion and other related problems have arisen from the handling of fumes from pickling operations in the Huntington, W. Va., Works of International Nickel. When a new pickling building for high-nickel alloys was being planned, company wished to take advantage of the experience gained



Exhaust hoods and main duct are located along one side of each pickling tank

Check 2305 opposite last page

in meeting these problems.

Results: Plastic fume removal system has withstood the fumes from acid pickling solutions — which contain various mixtures of hydrochloric, hydrofluoric, nitric, and sulfuric acids at temperatures from 125 to 190°F. There has been no evidence of corrosion and maintenance has been at a minimum.

Check 2306 opposite last page.



*"Now this is a thinking
man's filter . . ."*



the **WALWORTH CUSTOMER** *wants* **PLASTIC VALVES**
and **FITTINGS** *that can't corrode*
...here's how he gets them



fittings have high burst strength. Given those facts the Walworth Customer buys.

That may be the way you like to buy valves, too. If you insist on knowing about materials, workmanship and high quality, we'd like you for a Walworth Customer, too. For the newest literature on the complete line of PVC Valves and Fittings, get in touch with your Walworth Distributor.

Or write **WALWORTH** 750 Third Avenue, New York 17, N. Y.
DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

WALWORTH SUBSIDIARIES: ALLOY STEEL PRODUCTS CO. • CONOFLOW CORPORATION • GROVE VALVE AND REGULATOR CO.
M&M VALVE & FITTINGS CO. • SOUTHWEST FABRICATING & WELDING CO., INC. • WALWORTH COMPANY OF CANADA, LTD.

Check 2307 opposite last page

Straight talk on Pumping Muriatic Acid

Old-time process engineers used to shudder at the thought of pumping muriatic (hydrochloric) acid. This highly corrosive acid, as is well known, attacks most metals and packing materials, so that before the advent of Vanton Pump's unique sealless design, it presented a chronic and annoying pumping problem.

Two standard solutions were available in those days, neither of them completely satisfactory: one, rubber pumps, of conventional design, and with the usual seal problems; the other, pumps made of Hastelloy C, a special corrosion-resistant alloy, with special seals. This was extremely expensive, as these small-capacity pumps often cost considerable sums.

A Vanton sealless plastic pump now does the same job, without shaft seals, leakage, or maintenance problems—at one tenth the pump cost!

Vanton's solution is a combination of two new

ideas: new materials, plastics, that resist attack by almost any corrosive material going; and a radically new design, that eliminates shaft seal problems by simply eliminating shaft seals! Vanton sealless plastic pumps are now in use in factories throughout the nation, handling everything from sulfuric acid and hypochlorite bleach to abrasive slurries and contamination-sensitive solutions as well.

No matter what your corrosion, abrasion, or contamination-sensitive pumping problem may be, you deserve to take a look at what Vanton's combination of new design and new plastic materials can do for you. Write for descriptive literature to Vanton Pump & Eqpt. Div., Cooper Alloy Corp., Hillside, N. J.

Vanton Pump and Equipment Division

COOPER & ALLOY

Corporation • Hillside, New Jersey

A Monthly Series
by Carl Tylka,
Vanton Pump Technical
Service Director



Check 2308 opposite last page



REPUBLIC ELECTRUNITE HEAT EXCHANGER TUBES CARBON STEELS • STAINLESS STEELS • FARROWTEST

PROOF OF QUALITY... FARROWTEST®, an Eddy-Current method of non-destructive production testing. Write Republic today.

FARROWTEST REJECT TABLE

Wall Thickness (B.W. Gage)	Minor Dimension of Defect (Length or Depth)	Defective Area (Length, Depth Plane)
20	0.006 IN.	0.0025 Square Inches
18	0.006 IN.	0.003 Square Inches
16	12.5% of Wall	0.003 Square Inches
14 and 13	12.5% of Wall	0.004 Square Inches
12 and Heavier	12.5% of Wall	0.005 Square Inches

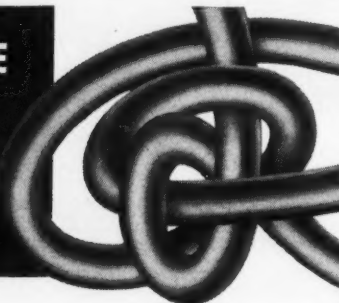
FARROWTEST detects and rejects not only tubing containing defects which completely penetrate the wall, but also tubing with defects equal to, or greater than, those shown in this table. For irregular defect shapes, a tube with defect area equal to or greater than shown above is rejectable. Where required, sensitivity of FARROWTEST equipment can be calibrated to reject defects of lesser specified area than shown in table, at extra cost.

REPUBLIC STEEL

STEEL AND TUBES DIVISION
207 East 131st Street • Cleveland 8, Ohio

Check 2309 opposite last page

MALTESE CROSS TEFLON HOSE



DOES "THE IMPOSSIBLE"!

Think of it. This new Hewitt-Robins hose offers long service with fluids that cannot be handled in premium standard constructions. Lined with Teflon, the latest DuPont fluorocarbon plastic, Maltese Cross Teflon hose is ideal for rugged steam, chemical, hydraulic, or pneumatic service. Inert to action of a great many corrosive chemicals, including

nitric acid and sodium hydroxide, temperature resistant from -65° to 420°F., and non-adhesive to cut flow resistance and simplify cleaning, this hose provides long-term returns on hose investment. Maltese Cross Teflon hose is available in sizes from 1/2" to 3" i.d. Write Hewitt-Robins, Stamford, Conn., today for Bulletin 6-42.



HEWITT-ROBINS

CONVEYOR BELTING AND IDLERS... POWER TRANSMISSION DRIVES
INDUSTRIAL HOSE... VIBRATING CONVEYORS, SCREENS & SHAKEOUTS

Check 2310 opposite last page

CORROSION CONTROL

Plastic-lead putty repairs tanks

Uses: For repairing lead tanks and other miscellaneous equipment.

Features: Material can be formed into any shape without heat or pressure. It is a good shield against radioactive materials.

Description: Material is made up of 94% lead and 6% plastic. After addition of a special hardening agent, it becomes very similar to lead itself in two hours. It exhibits excellent resistance against most solvents and acids.

(Devcon L is product of Devcon Corporation, Danvers, Massachusetts.)

Check 2311 opposite last page.

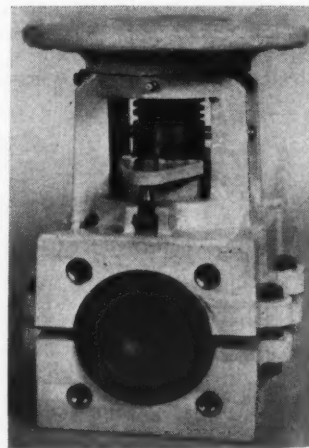
Sliding-spindle design permits easy sealing of valve packing

Seats of carbon and Teflon
reduce galling

Uses: Applications requiring corrosion-resistant valves.

Features: Sliding-spindle design permits easy sealing-off of valve packing and makes valve adaptable to motorized automatic operation. Seat of carbon and Teflon plastic reduces galling and sticking.

Description: Globe valve is designed for use under pressures up to 100 psi. It has steel



Graphite globe valve has steel casting enclosing body to prevent damage

CHEMICAL PROCESSING

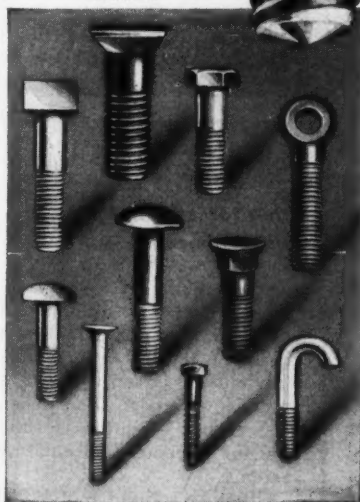
Threaded Specialties

lower cost
EYE BOLTS
by an
exclusive method

Among Pawtucket's many specialty products are these lower-cost eye bolts or "swing" bolts. Pawtucket's exclusive production method keeps cost low, dimensional accuracy unusually high and strength above standard.

Pawtucket eye bolts are made in standard sizes 1/4" and larger, or to your specifications. In any size, you can depend on uniform Class 3 fit, if required.

All standard steels, stainless steels and non-ferrous metals, including Titanium



BETTER BOLTS SINCE 1882

PAWTUCKET
MANUFACTURING COMPANY

327 Pine St. • Pawtucket, R. I.
THE PLACE TO SOLVE YOUR BOLT PROBLEMS
T.M. REG.
"The Bolt Man"

Check 2312 opposite last page

JUNE 1959

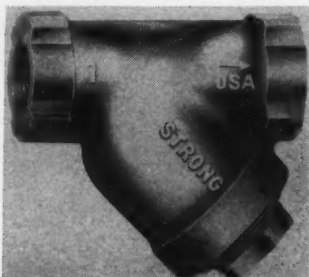
CORROSION CONTROL

casting enclosing graphite body to prevent external-shock damage. External pointer indicates valve position (open or closed).

Valve can be operated in horizontal, vertical, or 45° position. It is presently available in 2" size. Other sizes will be 1, 1½, 3, and 4".

(Type-G globe valves are product of National Carbon Company, Division of Union Carbide Corporation, 535 Fifth Ave., New York 17, N.Y.)

Check 2313 opposite last page.



Stainless-steel strainers

... are designed for service under condition of high temperature, high pressure, and corrosion. They may be used as in-line fittings in steam, liquid, gas, and chemical lines.

Body, cap, gasket, and screen are of Type 316 stainless steel. Replaceable screens are available with 0.045, 0.062, and 0.125" perforations.

Strainers produced in screwed- or socket-weld connections for standard pipe size from ½ to 2". Maximum non-shock working pressures vary from 650 to 3000 psi over temperature range of -50 to +1200°F.

(Strong SSY strainer is product of Strong, Carlisle & Hammond, 508 Sandusky St., Conneaut, Ohio.)

Check 2314 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

MOST COMPLETE LINE

Eleven Product Groups
Serve Every Sealing Need

GROUP NO. 7

Sheet Packings

Forty-two styles of superior Sheet Packings are offered in the Belmont Line.

Unmatched variety of constructions—to suit every sheet packing requirement in service against steam, oil, solvents, corrosive chemicals and extremes of temperature—includes compressed asbestos, woven asbestos metallic, "Petrola" fibre, cork, red rubber, natural rubber, G.R.S., Neoprene, Buna-N, Silicone, Diaphragm sheet and Teflon.

Cut gaskets are also available from all of these materials.

See your Belmont Distributor, or write for name of one nearest you.

OTHER BELMONT PRODUCT GROUPS

- | | |
|------------------------------------|-----------------------|
| 1. High Pressure Asbestos Packings | 5. Hydraulic Packings |
| 2. Valve Stem Packings | 6. Bel-Vee V-Rings |
| 3. Rotary Pump Packings & Seals | 8. Gaskets |
| 4. Criss-Cross Braided Packings | 9. Metallic Packings |
| | 10. Plastic Packings |
| | 11. Expansion Joints |

MOST CONVENIENTLY AVAILABLE

Nationwide Industrial
Distributor Organization
Provides On-the-Spot Service

BELMONT

The Belmont Packing and Rubber Company
Butler & Sepviva Streets, Phila. 37, Pa.

Check 2315 opposite last page



New blower...its cast Inconel hub takes stresses of 3500 RPM spin in hot corrosives

It spins at 3500 RPM in a fiery, corrosive-gas-laden environment.

That's why this new blower, made by Buffalo Forge Company for a major chemical producer, is made of Inconel* nickel-chromium alloy parts.

Inconel alloy provides a high combination of strength and corrosion resistance at high temperatures.

Inco foundry casts critical hub

Buffalo Forge took no chances with

the most critical part in the blower. To be sure that exacting specifications were met, they had the makers of Inconel alloy make the hub casting. As long-term customers of Inco's Bayonne, N. J. foundry, they knew they could depend on Inco to produce a sound, uniformly strong casting; one that would bring out the best that was in the alloy.

Take a tip from Buffalo forge...

When you design for extreme condi-

tions, consider the properties of Inconel alloy. And, if the part is to be cast, call on Inco to cast it.

A 9-page Inco technical bulletin, "Engineering Properties of Cast Inconel Alloys", gives the data you need...compositions, physical properties, machining procedures, and much more. We'll be more than glad to send you a copy. *Registered trademark

The International Nickel Company, Inc.
67 Wall Street New York 5, N. Y.



INCO-CAST PRODUCTS

Check 2316 opposite last page

CORROSION CONTROL



Molded-rubber pail

... is designed to resist strongest acids, soaps, gasoline, paints, and other corrosive liquids. Pail is made with neoprene and weighs only six pounds.

Rubber pail is molded in one piece. The 18-quart container is highly durable and resistant to temperature extremes. Pail is graduated in quarts and half-gallons.

(Molded-rubber pail is product of Cauchotex Industries, Inc., 44 Whitehall St., New York 4, N.Y.)

Check 2317 opp. last page.

Inhibitor effective, yet low in cost

Application of sodium molybdate in combination with orthophosphate makes it possible to reap sodium molybdate's advantages at a much lower cost than when used alone. Inhibitor is suitable for aqueous recirculating systems.

Although sodium molybdate has been known to be an effective corrosion inhibitor, for some time, cost has been a limiting factor. By incorporating orthophosphate, smaller quantities of sodium molybdate can be used, with equally effective inhibitive properties. Sodium molybdate is non-toxic and colorless.

Inhibitor is expected to find acceptance in equipment

where toxic materials cannot be used. It is suitable for application in refrigeration systems, cooling towers and jackets, recirculating hot water systems, boilers, anti-freeze compositions, and air-conditioning systems. Testing and field trials have confirmed its effectiveness.

(Sodium molybdate inhibitor is product of Climax Molybdenum Company, Div. of American Metal Climax, Inc., 500 Fifth Ave., N.Y. 36, N.Y.)

Check 2318 opposite last page.

Tantalum bayonet heaters have higher rate of heat transfer

Tantalum bayonet heaters having a rate of heat transfer seven to eight times greater than that obtained with con-tional units are announced. Since tantalum can be used in most environments without perceptible corrosion, extremely thin wall sections can be used, with consequent improvement in heat transfer rate. High ductility of metal assures excellent resistance to physical and thermal shock.

(Tantalum bayonet heaters are product of The Pfadler Co., Div. of Pfadler Permutit, Inc., Rochester, N.Y.)

Check 2319 opposite last page.

Fluorocarbon covered, O-ring resists corrosion

Silicone O-ring covered with Kel-F can be used in contact with highly corrosive materials. It can resist concentrated sulfuric, hydrofluoric, hydrochloric, fuming nitric, aqua regia, strong caustic, and other oxidizing materials. O-ring has low coefficient of friction, good thermo characteristics, good resistance to extrusion, and low compression set.

(Kel-F covered O-ring is product of Fluoro-Plastics, Inc., Div. of Flexrock Company, 2417 Federal St., Philadelphia 46, Pa.)

Check 2320 opposite last page.

Teflon-lined pipe helps plant save \$60,000 per month... enables corrosive process to stay on stream

Problem: Excessive maintenance costs and product losses ran as high as \$60,000 per month during first six months' operation of process at a major chemical plant.

The process for the manufacture of a chemical intermediate involves handling hydrochloric acid and organic liquids at temperatures exceeding 275°F. In the past, the highly corrosive properties of this combination had restricted material of construction to non-metallics.

Laboratory work established that many potential advantages could be obtained by increasing operating pressure from a normal level up to several atmospheres. However, a new material of construction would be required for the high pressure service.

An exhaustive search for satisfactory piping materials included a number of alloys, plastics, and other types of materials. The most promising of these were installed. In spite of this program, such frequent failures occurred that on-stream time averaged only 75% during the first six months' period of operation.

Solution: It was found that two experimental lengths of steel pipe lined with Teflon TFE-fluorocarbon resin had been placed on test previously. Both had provided excellent service for 24 months at 230°F and 10 psig. Both were then reinstalled in the new pressure system and were in operation for several more months without failure.

Based upon this and other encouraging results, conversion to steel pipe lined with TFE resin began as soon as it became commercially available. Plant now has more than 1500 feet of the lined pipe in service. Most of it is of 2" size although some up to 6" in diameter is in use. More than 400 Teflon TFE-fluorocarbon lined fittings are in use at the plant.

Results: No failures of the lined pipe have occurred. Some of it has already been in service more than 15 months. Outstanding performance of the lined pipe under the severe conditions has been a major factor in saving the \$60,000 per month that was being lost through excessive maintenance and loss of product. Use of the lined pipe promises to make the process as reliable as those with no special materials of construction problems.

NOW
OVER
2
YEARS

In the petroleum industry, pipe lined with Teflon has been found to be quite useful for handling hydrofluoric acid at elevated temperatures and pressures. Lined pipe has also proved valuable in chlorination, sulfonation, and nitration processes. Method used by manufacturer for lining pipe compensates for thermal expansion of liner to the extent that fatigue problems and reduction in flow diameter are eliminated.

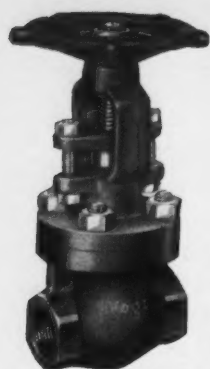
(Fluoroflex-T pipe and fittings lined with TFE-Fluorocarbon resin are manufactured by RESISTOFLEX CORPORATION, Woodland Rd., Roseland, N. J.) Dept. 267

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Complete systems for corrosive service
Resistoflex

ROSELAND, NEW JERSEY · WESTERN PLANT: BURBANK, CALIF. · SOUTHWESTERN PLANT: DALLAS, TEX.

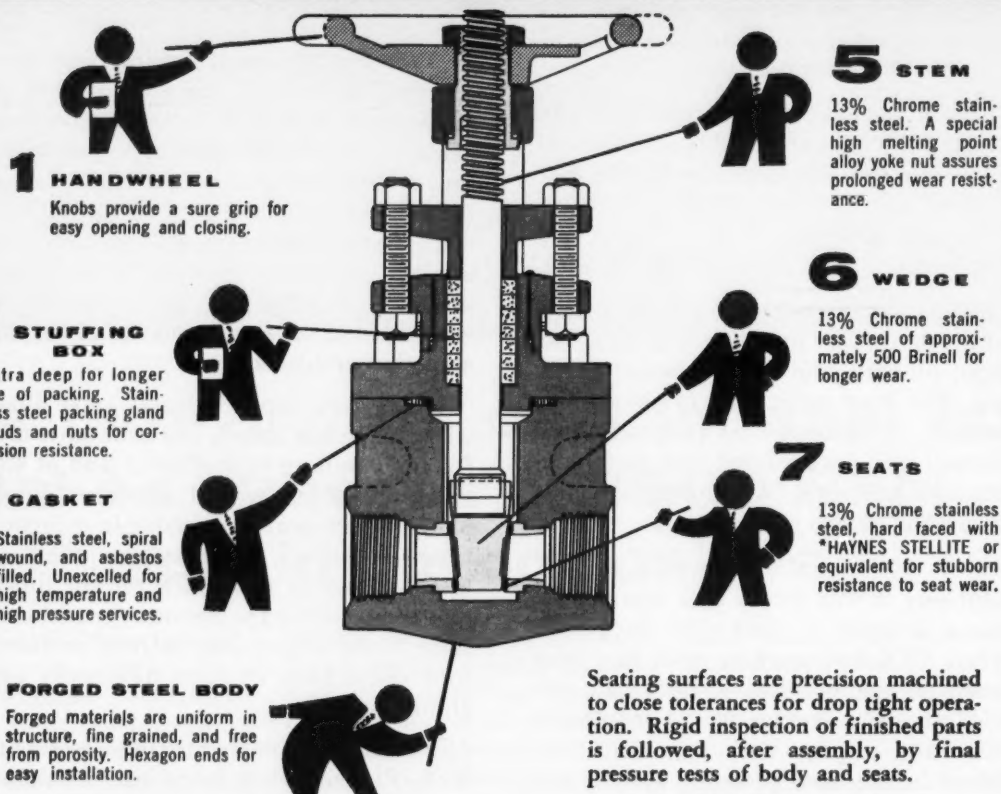
Check 2321 opposite last page



150-800 POUNDS SERVICE
2000 POUNDS COLD, W.O.G.
SIZES 1/4" THRU 2"

A NEW Voegt

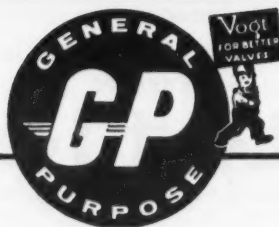
with 7 superior features



*Trade mark of Union Carbide Chemicals Co.

Address Dept. 24A-FCP.

Voegt



HENRY VOGT MACHINE COMPANY, Louisville, Ky.

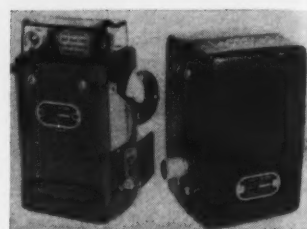
SALES OFFICES: New York, Chicago, Cleveland, Dallas, Camden, N. J., St. Louis, Charleston, W. Va., Cincinnati.

FORGED STEEL

VALVES

Check 2322 opposite last page

CORROSION CONTROL



Holiday detector

... is designed for inspecting thin film coatings for pin holes and voids during application process. Original model (left, above) was housed in leather case with both signal bell and relay in exposed positions. Bell battery had limited capacity and required frequent renewal.

New model (right, above) will be housed in two-color Royalite case. Signal bell and relay are now totally enclosed and bell battery comprises two standard flashlight batteries.

Inspection voltage of 67.5v remains same, so that two detectors accomplish exactly the same result.

(Model M-1 holiday detector is product of Tinker & Rasor, Box 281, San Gabriel, Calif.)

Check 2323 opposite last page.

Teflon reagent head added to feeder

Possibility of metallic ion contamination is eliminated by the addition of Teflon reagent head assembly to con-



Corrosion-resistant feeder

trol volume diaphragm pump, used for handling corrosive liquids. Teflon diaphragm protects pump's working parts.

(Pulsafeeder with Teflon reagent head is product of Process Equipment Div., Lapp Insulator Co., Inc., LeRoy, N.Y.)

Check 2324 opposite last page.

CORROSION CONTROL



PVC-lined pipe, used to carry corrosive slurry, being installed

PVC-lined pipe carries corrosive coal slurry

Economical pipe — which is strong enough to resist pressures to 1000 psi — has not developed a trace of corrosion during six months operation in spite of high sulfur content of coal

Problem: At the Pittsburgh Works of Jones & Laughlin Steel Corporation, high sulfur content of coal slurry to be handled would create a severe corrosion problem if regular steel pipe were used.

Piping was to be used in connection with a system designed to collect coal dust that was being vented into the atmosphere. Dust came from three pulverizers used to crush coal for boilers. As part of smoke abatement and waste treatment program, three gas scrubbers were installed on the coal pulverizer vent pipes to collect the dust.

Engineers at the plant wanted to pump the collected dust in a slurry form to a point 350' from pulverizers, where it would be mixed with dust from blast furnaces. Mixture is used later in a sinter-

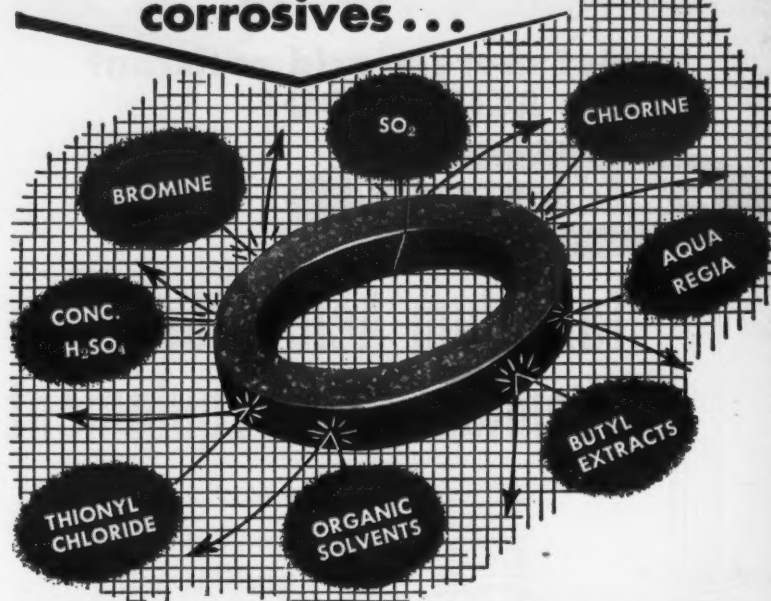
ing process to produce a high-grade charge for blast furnaces.

Plant was faced with a problem of finding a suitable method of piping the corrosive coal slurry over the 350' distance.

Solution: A recently developed pipe consisting of an unplasticized polyvinylchloride lining in a steel jacket was installed to handle the corrosive slurry. PVC lining gives pipe resistance to a broad range of corrosives at temperatures to 150°F. Steel jacket gives pipe high strength, permitting it to withstand pressures to 1000 psi.

PVC-lined pipe can be installed quickly and easily. Mill-rolled grooves at ends enable pipe lengths to be joined by grooved couplings. These lock into place, assur-

If you pump these corrosives ...

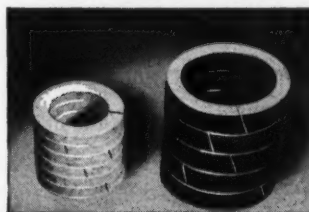


Get months of Trouble-Free service with CHEMPRO TEFLON PACKINGS

If your pumps and valves handle highly corrosive industrial chemicals, CHEMPRO TEFLON PACKINGS will drastically cut packing replacement and maintenance costs. CHEMPRO Packings last for many months under corrosive conditions which make ordinary packings useless in days or even hours. They stop leakage by providing a tight seal at only slight gland pressure, and their very low coefficient of friction often makes lubrication unnecessary.

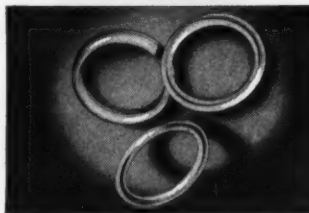
TEFLON® PLASTIC STUFFING BOX PACKING

Ideal for either centrifugal or reciprocating pumps operating at speeds up to 3600 R.P.M. handling corrosives at temperatures from -118° F. to 525° F. Style No. 101 composed of 94% shredded Teflon and chemically inert graphite as a friction reducer. Style No. 201 same as No. 101 except that mica is used as friction reducer. Both styles made to fit every size stuffing box on standard process equipment.



TEFLON V-TYPE PACKINGS

For reciprocating pumps and hand, air and motor operated valves handling corrosive materials. Lips of very sensitive pressure rings expand proportionately to increased operating pressure thereby preventing leakage. Suitable for temperatures from -150° F. to 550° F. Unsuitable for centrifugal or rotary pumps. Supplied in bulk or in complete sets to fit specific stuffing boxes.



Chemical & Power Products engineers are packing and gasket specialists with complete fabricating facilities to meet your specific requirements. Write for our complete Teflon Packing and Gasket Catalog.

*Du Pont Trademark



CHEMICAL & POWER PRODUCTS, INC.
The Original Fabricators of Teflon Packings and Gaskets

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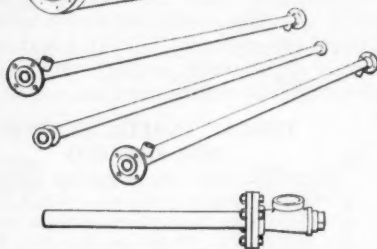
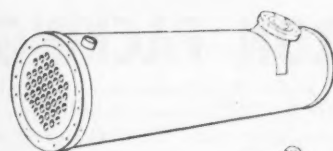
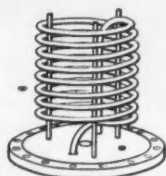
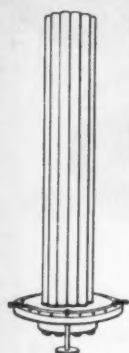
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TANTALUM

**Not merely acid resistant
but ACID PROOF**

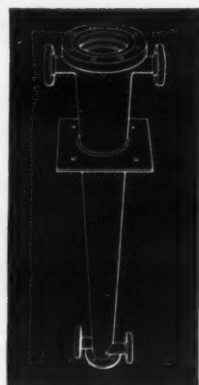


Tantalum Acid Proof Chemical Plant Equipment



- Absorption Plants
- Acid Concentrators
- Acid Condensers
- Acid Heat Exchangers
- Acid Evaporators
- Anhydrous HCl Plants
- Bayonet Heaters
- Bromine Equipment
- Heater Coils
- Laboratory Pilot Plants
- Plate Heaters
- Special Equipment
- Steam Jets and Spargers
- Thermometer Wells

The acid proof nature of the metal tantalum means that equipment can be fabricated for processing some of the most severe corrosives. This immunity of tantalum reduces equipment maintenance, eliminates production shutdowns and thus assures continuous operation in the manufacture of acids and heavy chemicals. Where fine chemicals, pharmaceuticals and foods are the products, tantalum equipment also removes the threat of costly product contamination and undesired side reactions. Why not use the experience of Fansteel engineers in the application of Tantalum Process Equipment in your plant. Write for latest technical data bulletin 3.506-1.



G591A

FANSTEEL METALLURGICAL CORPORATION

NORTH CHICAGO, ILLINOIS, U. S. A.

Check 2326 opposite last page

CORROSION CONTROL

ing a positive seal at joints. System of joining permits an installation to be dismantled and reassembled without damage to lining.

Pipe ends as well as interior surfaces are completely protected with the PVC lining. Smooth surface of PVC results in a low friction coefficient, with less resistance to flow.

Outer jacket is made of electric-resistance-welded steel. Strength of this jacket eliminates need for trenching or a close spacing of supports.

It also has a weight advantage which allows it to be suspended without need of heavy hanger brackets. Pipe is manufactured in 20' length in 2, 3, and 4' nominal OD sizes. Pipe is comparatively low in initial cost.

Results: PVC-lined pipe has carried the coal slurry for more than six months without a trace of corrosion. Experience has shown that unlined steel pipe would have been badly corroded by the sulfur in the slurry.

(Jal-Jacket PVC-lined pipe is product of Jones & Laughlin Steel Corporation, 3 Gateway Center, Pittsburgh 30, Pa.)

Check 2327 opposite last page.

Galvanized-iron tanks in corrosion-resistant crude-oil storage

Bolted steel oil tanks conform to API specs

Five hot-dip galvanized-steel bolted crude-oil storage tanks, having capacity of 1000 bbl each, have given good service at Humble Oil & Refining Company, McClutcheon Lease, Winkler County, Tex.

Zinc-coated tanks such as these, made to American Petroleum Institute specifications, have been found useful in areas such as Gulf Coast Region. Crude in this area is high in hydrogen sulfide, and salt water entrained in oil can create serious corrosion problems. In swamp lands of Louisiana and Texas, atmospheric conditions lead to corrosion on outside of tanks. Experience of some plants has

PUMP PROBLEMS

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DECIDING
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OF
PUMPS...**

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pump misapplication.

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FIG.
19.488

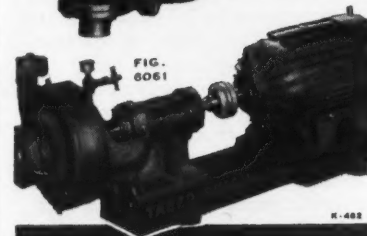


FIG.
6061

TABER

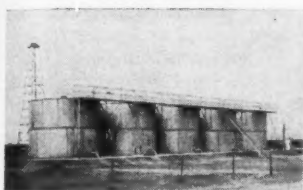
Check 2328 opposite last page

CHEMICAL PROCESSING

CORROSION CONTROL

shown that galvanized tanks last twice as long as steel tanks.

Galvanized bolted steel tanks are fabricated from hot rolled-steel sheets. Material thickness depends on tank capacity. Sheets of 12 gage are most common. Tank is com-



Galvanized crude-oil storage tanks have application in Gulf Coast Region where crude is high in hydrogen sulfide. Salt water entrained in oil also can create serious corrosion problems

posed of pre-formed segments. These consist of roof and deck sections, in addition to staves which are bolted together with gasket material for seal.

Floor sections are flat. Deck sections are fabricated with deep-formed flange which functions as stiffener and renders unit self-supporting.

Another typical galvanization application is in a polyethylene plant near Houston. In this plant, which recently went on stream, all steel was zinc coated to control corrosion.

(Further information concerning galvanized tanks may be obtained from American Zinc Institute, Inc., 60 E. 42nd St., New York 17, N.Y.)

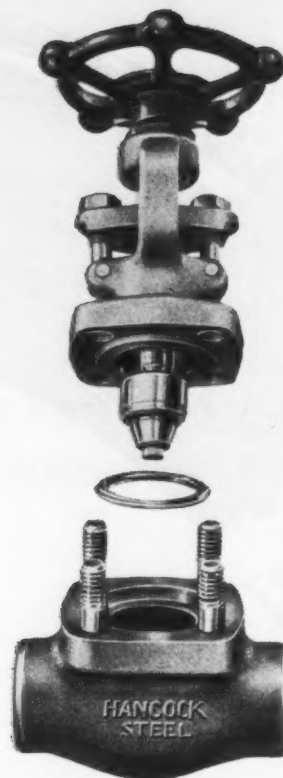
Check 2329 opposite last page.

Expansion joints made of rubber, neoprene, and lined with Teflon are explained in bulletin. Flexible couplings are also covered. Bul AD-137 — The Garlock Packing Company, Palmyra, N.Y.

Check 2330 opposite last page.

Flexible rubber pipe for use where ever corrosion, abrasion, vibration, or thermal expansion are a problem is discussed in brochure. — Manhattan Rubber Division, Raybestos-Manhattan, Incorporated, Passaic, New Jersey.

Check 2331 opposite last page.

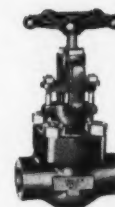


NEW VALVE-OLOGY

shuts off costly maintenance

Hancock 600# Steel Valves incorporate new concepts in valve-ology that reduce valve maintenance and equipment down-time. The forged steel bonnet and body have butting flanges so strong no distortion is possible. The flanges form a bonnet joint that utilizes the sealing power of a Flexitallic* gasket so effectively not even pressures exceeding ten times the rating of the valve can cause a blowout.

Hancock valve-ology makes full use of stainless steel to reduce your valving cost. Seat, disc, stem, swing bolts and nuts, thread bushing, packing gland follower—all are stainless steel. Globe, Angle, "Flocontrol", Lift Check, and Hi-Pressure Drop designs available. A high degree of standardization simplifies servicing and inventory needs. Your industrial supply distributor will gladly give you full details on Hancock Valve quality and performance. Phone him today.



Hancock 600# Steel Globe Valve. Type 5500 Line. Sizes: 1/4" thru 2".

*Trademark of Flexitallic Gasket Company



HANCOCK STEEL VALVES

A product of

MANNING, MAXWELL & MOORE, INC.

Consolidated Ashcroft Hancock Division • Watertown, Massachusetts
In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario

Check 2332 opposite last page



SAFETY IN THE RIGHT PERSPECTIVE with Flexitallic Spiral-Wound Gaskets

In this enlarged sectional view, you can see the Spiral-Wound Gasket construction originated by Flexitallic in 1912. And you can see Flexitallic Blue, the blue dye in the Canadian asbestos filler, which is the mark of an engineered Flexitallic Gasket.

Flexitallic means sealing at its safest. You get performance you can depend on throughout all pressure/temperature ratings, because the compression characteristics of the gasket are always related to the pressure/temperature ratings of the flanges with which they are assembled.

When fluids are confined in a critical pressure/temperature range . . . when flanged joints are subject to thermal and mechanical shock, vibration, weaving, and other joint stresses . . . engineers demand the maximum in gasket performance.

That's why they specify Flexitallic Spiral-Wound Gaskets.

FLEXITALLIC GASKET CO.
8th & Bailey Sts. Camden 2, N.J.

Flexitallic
SPIRAL-WOUND GASKETS

FOR PIPE FLANGES, PRESSURE VESSELS AND PROCESS EQUIPMENT

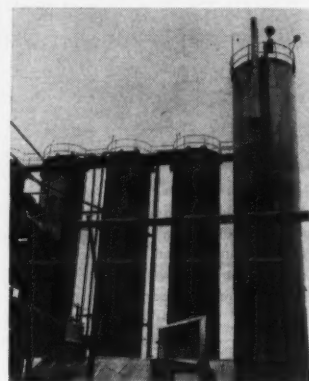
*Flexitallic is a registered tradename. No one else can make a Flexitallic Gasket. Look for *Flexitallic Blue* — it's our exclusive blue-dyed Canadian asbestos filler.

Check 2333 opposite last page

CORROSION CONTROL

**Stainless steel towers
still good after 30
corrosive years**

Over three decades of producing highly corrosive nitric acid and sodium nitrite, plus outdoor exposure to weather and chemical gases, has failed to damage four 52' stainless



Stainless steel towers have withstood the onslaught of nitric acid and sodium nitrite

steel absorption towers at a Middle-eastern chemical plant. Originally installed in 1926, the towers are made of Type 430 stainless.

Towers were used for production of nitric acid until 1948. Since that time they have been used for the manufacture of sodium nitrite. Towers have an inside diameter of 10'. Shell sections and bottom head are $\frac{3}{8}$ " thick, while top head is $\frac{5}{16}$ " thick. At no time has welding been necessary. Original packing has never been replaced in the towers.

(Enduro Type AA (430) stainless steel is product of Republic Steel Corporation, 1405 Republic Steel Bldg., Cleveland 1, Ohio.)

Check 2334 opposite last page.

Solenoid valves of bronze and stainless steel construction for use with corrosive and other applications at temperatures from -300 to 500°F and pressures from 0 to 10,000 psi are discussed in the catalog. Cat 444 — Atkomatic Valve Company, 545 West Abbott St., Indianapolis, Ind.

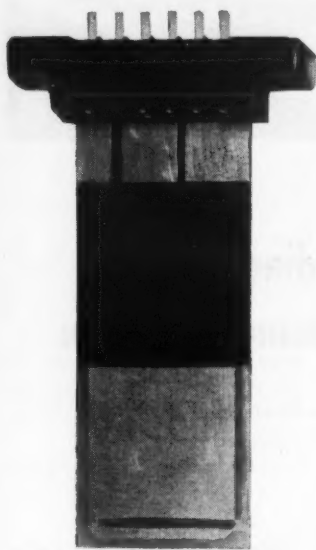
Check 2335 opposite last page.

**Liquid, gas contaminants
measured by probe**

Uses: Measurement of corrosion and liquid and gaseous contaminants.

Features: Probe can detect changes in humidity, ozone concentration, water content in non-aqueous liquid, and other environmental conditions.

Description: Essential element of probe is vacuum-deposited film of metal, 2 to 50 millionths of an inch thick. Metal varies with application,



Black portion of electrical-resistance probe is reference section; lower or non-black part is active element

but usually is one which is readily attacked by compound to be measured.

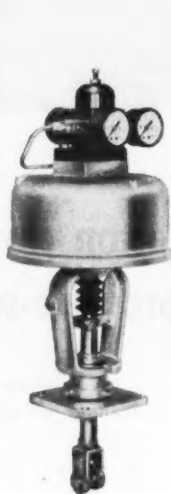
Since instrument connected to probe can detect as little as five billionths of an inch of metal loss, small concentrations of corrosive compounds can be quickly detected. By treating metal surfaces beforehand with chemicals, extremely close tab can be kept on progress of corrosion in various processes.

(Electrical-resistance probe is product of Crest Instrument Company, Division of Magna Products, Inc., 11808 S. Bloomfield Ave., Santa Fe Springs, Calif.)

Check 2336 opposite last page.

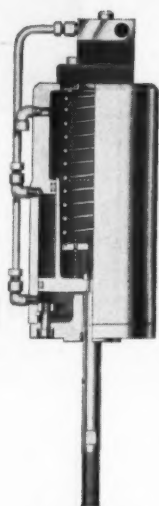
Annin OFFERS YOU MORE IN ACTUATORS

Your choice OF ADVANCED DESIGNS
WITH MORE PRECISE POSITIONING AND
DYNAMIC RESPONSE CHARACTERISTICS



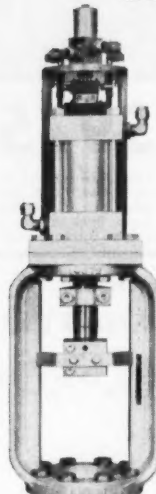
**1542 & 1544 SERIES
DOMOTOR POWERED
ACTUATORS**

Two types, "Direct Thrust" (illustrated) or "Lever" units are available for any application requiring accurate positioning in response to a pneumatic signal, such as butterfly valves, dampers, turbines and engine governors. Guaranteed positioning accuracy of better than 0.001" per inch of stroke over the complete range of piston travel is combined with a smooth operating action that provides an accurate, stable output force.



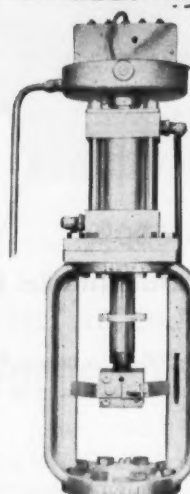
**600 SERIES
STROKE POSITIONING
ACTUATORS**

Offered primarily for the control of variable speed drives, rheostats, pumps and cams, as well as control valves, with strokes up to 6 inches and forces up to 2510 pounds of thrust. Compact and rugged, for easy mounting on existing equipment. May be operated from a standard 3-15 psi instrument signal, with a positional accuracy within 0.001" per inch of stroke.



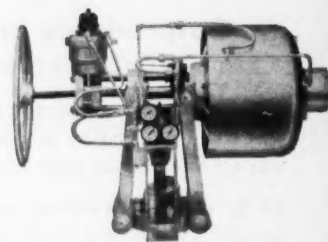
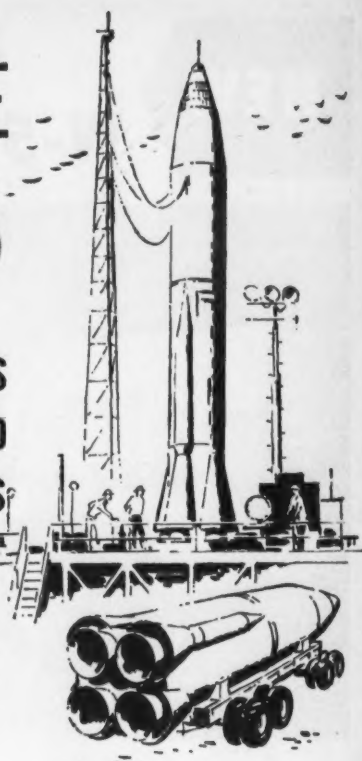
**10,000 SERIES
PNEUMATIC-HYDRAULIC
ACTUATORS**

For valves requiring strokes to 6 inches and thrusts to 100,000 lbs. Furnished on body assemblies where process conditions require very fine valve response, high speed and stability. Operate on 1500 psi oil supply system from any common instrument air signal.



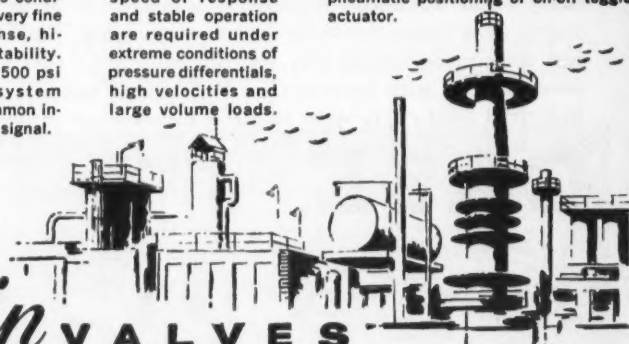
**20,000 SERIES
ELECTRO-HYDRAULIC
ACTUATORS**

Provide a means of converting an electrical signal to a powerful hydraulic positioning force, where high speed of response and stable operation are required under extreme conditions of pressure differentials, high velocities and large volume loads.



TOGGLE ACTUATORS

For process requirements where the unbalanced forces are extremely high, or where large through-puts are required. Three types are offered: pneumatic positioning, pneumatic on-off, and manual control, all embodying the toggle actuator; or a manual control arrangement can be combined with the pneumatic positioning or on-off toggle actuator.



Annin VALVES

THE ANNIN COMPANY

Write for Bulletin 1236-ST

1040 S. Vail Avenue, Montebello, California

Check 2337 opposite last page

NEW

CASE W-5 Terraload'r



\$5975

Complete with 1-cu. yd. bucket, F.O.B. factory, plus freight and taxes. Price subject to change without notice.

... Saves you up to \$1500⁰⁰

... Outproduces any machine in its class!

Field tests prove the new 3000-lb. capacity Case W-5 Terraload'r will outproduce any competitive machine in its class ... save you up to \$1500 in initial cost.

73% more crowding power—Exclusive parallel hydraulic circuit, plus 30 gpm pump and specially designed tilt linkage, give the W-5 Terraload'r unequalled breakaway force of 7800 lbs., to speed your loading cycles.

Better balance and maneuverability—24.2% more empty weight on rear wheels, lets you carry heaped loads at higher speeds, with less spillage. Front-wheel drive and rear-wheel power-steer permit turns within 10'4" radius.

Many other advanced features—Efficient 164-cu. in. Case gas engine, plus torque converter and forward-reverse power-shift, are just three more reasons why you can move more tons per day at lower net cost with the new Case W-5. See it today at your Case Industrial Dealer's, or write us direct for complete information.

CASE

J. I. CASE COMPANY
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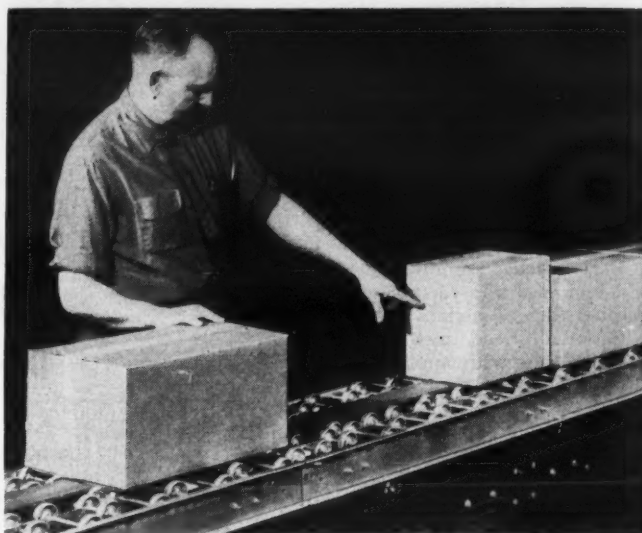


Producers of the world's most advanced line of wheel and crawler machines for earthmoving and materials handling

Check 2338 opposite last page



**MATERIAL HANDLING
and PACKAGING**



Carton crowding halted by pressure-sensing conveyor

... which can be stopped
without jam-up of conveyed items

Uses: Wheel- or belt-conveyor applications.

Features: When stop is placed in line, only contact between belt and containers is that involving first container in line. Result is low, constant accumulation pressure, regardless of length of accumulation. Horsepower requirements are low.

When stop is removed belt does not contact second carton until first is well under way. In this manner, containers are spaced all along line. Container control is thus expedited. Spacing permits easy raising of stops.

Since belt comes into contact with container gradually after stop is removed, start is smooth and gentle. Due to this fact, conveyor can successfully accommodate relatively unstable loads such as cartons stacked two- or three-high or loosely loaded pallets.

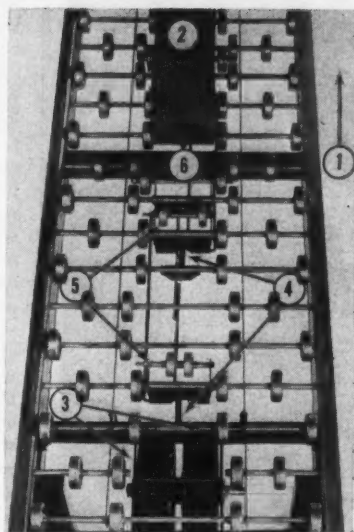
Description: Essentially, adjustable-pressure-control wheel-conveyor unit consists of powered wheel conveyor with four-inch belt in lieu of center load-bearing wheels.

Pressure sensing of conveyor is via system of trigger wheels linked with pressure wheels. Through these, optimum belt pressure is delivered to move cartons of varying weight. Spring-loaded pressure wheels permit adjustment by means of self-locking nut according to load requirements.

Belt installation is sufficiently flexible to allow for adjustment to varying loads. Because of this, tension is not a major wear factor.

Unit has positive tracking. Molded-on guide piece runs length of underside of belt. Twin pulleys at either end of conveyor are spaced so as to accept guide piece. Alternate

4 Separation of accumulated cartons for removal or insertion of a single carton requires only fingertip pressure.



Conveyor moves in direction indicated by arrow (1). Belt (2) has been folded back (note that this reveals underlying tracking ridge) to show twin pulleys (3) (spaced so as to accept ridge of belt); springs (4) which keep compression on pressure-wheel pairs (5); trigger-wheel pair (6); and load-bearing wheels (not numbered). There is no trigger-wheel assembly at lower end of conveyor, because this is charge or beginning end of unit

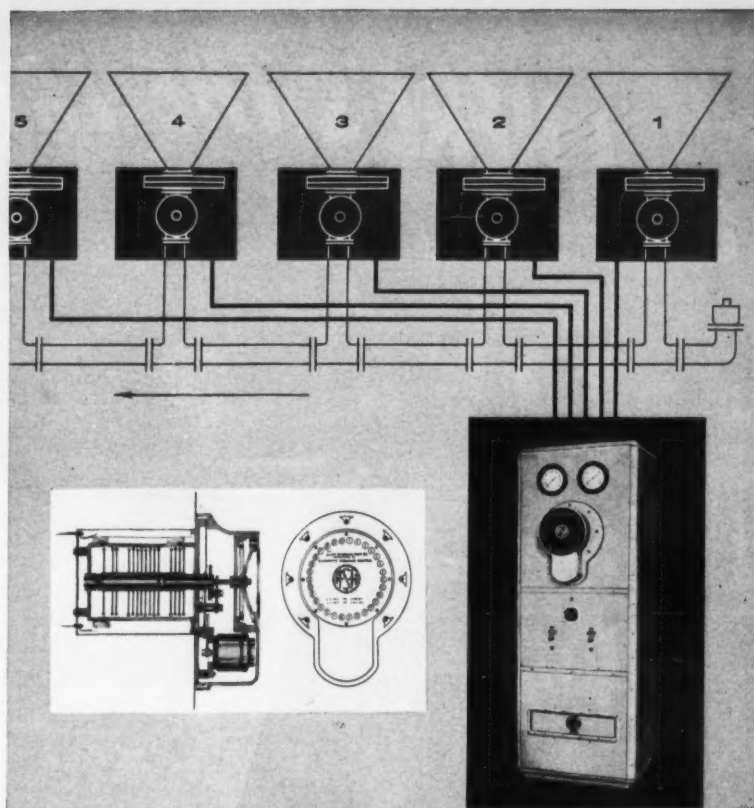
sets of pressure wheels, set close together, form a groove through which guide piece tracks.

Conveyor units are available in 5- and 10-ft sections. Minimum length is 15 ft while maximum is 200 ft. Standard

widths are 12, 18, and 24". Maximum recommended loading for operation is 50 lb/lineal ft.

Power is from 1/3-, 1/2-, or 3/4-hp motors. Standard speed is 65 fpm, but available fixed-

To next page



AUTOMATIC SEQUENCE CONTROL solves handling and mixing problems

Here is a proven, practical control that will activate up to 30 pieces of equipment in one cycle—more by recycling—required to operate in a predetermined order. These may be valves, motors or other related equipment, and may be activated by almost any predetermined external impulse: change in vacuum, pressure, temperature, weight, electrical, etc.

The A-S-H Automatic Sequence Control is a completely contained unit that can be mounted on a standard cubicle or your existing panel board. Indicator lights inform operator of progress of operation. Idle portions of systems may be bypassed by group selector switches located adjacent to the Control.

For detailed information and illustrations, request our new 4-page Data Sheet EEa, "Automatic Sequence Control."

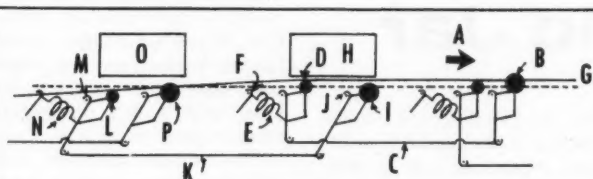


the **Allen-Sherman-Hoff** company

257 E. Lancaster Ave., Wynnewood, Pa.

Offices and representatives in principal cities

MATERIALS HANDLING EQUIPMENT



How It Works

Cartons are moving in direction of arrow (A). They are supported by load-bearing wheels. These load-bearing wheels are not shown in diagram, but level of top of wheels is designated by dotted line.

Trigger-wheel assembly (B) is linked by rod (C) to pressure-wheel assembly (D). This pressure-wheel assembly is kept in position by spring assembly (E), which is fastened to fixed bracket (F). Since (B) is not depressed neither is (D). Therefore belt (G) is pressed against first carton (H).

Trigger-wheel assembly (I) is depressed by weight of first carton (H). Accordingly, as-

sembly has rotated about point (J). This rotation has caused [via connecting linkage (K)] pressure-wheel assembly (L) to be rotated about point (M) and correspondingly depressed below load-bearing wheel level, thus compressing spring (N).

Belt (G) which rests on pressure wheels is lowered from contact with second carton (O). This carton depresses trigger-wheel assembly (P), and cycle is continued on down line.

(Note that connecting rods are located at alternately different levels in this diagram only for the sake of clarity. Actually, they are on same level.)

Check 2339 opposite last page

and **HERE'S THE LATEST!**



the **NEW** 32 oz. Plastic Jar

Here's the latest star performer in our line-up of plastic jars and vials—the big, beautiful 32 oz. jar. Available for immediate shipment in two materials: linear polyethylene with overflow capacity of 32.3 fluid ounces—weight 211 pounds per thousand; or polystyrene (clear) with overflow capacity of 33.8 fluid ounces—weight 212 pounds per thousand. Either jar takes a standard 120 mm closure.

An equivalent capacity glass jar weighs $4\frac{1}{2}$ times greater. That adds up to tremendous savings in freight and materials handling. And loss from breakage is held to an absolute minimum. Take advantage of our trial offer and see for yourself. Ask for our free brochure that describes in detail the widest variety of stock plastic jars and vials available anywhere.

REMEMBER . . . at Celluplastic Your
Packaging Problem is Our Business.



CELLUPLASTIC CORPORATION

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ENTER A TRIAL ORDER!

Sirs:

Please enter my trial order for:

- ☐ 100 linear polyethylene 32 ounce jars at \$42.00
☐ 100 polystyrene (clear) 32 ounce jars at \$35.00
☐ Also ship 100 black metal closures with pulp and vinyl liners at \$5.80 per hundred.

Name _____

Address _____

☐ My check is enclosed

☐ Invoice our company

HANDLING & PACKAGING

From preceding page

speed ranges are to 100 fpm. Drive permits lowering of conveyor to within 15" of floor. Units may be obtained with wheels set above or below level of frame.

Starting 12" from charge end of conveyor, and at 12" intervals thereafter, are adjustable pressure-wheel assemblies. Free to pivot, each assembly is attached over an axle and held up by a compression spring. These wheels support belt. Beginning 15" after first adjustable pressure-wheel assembly, and at 12" intervals thereafter, are trigger-wheel assemblies, each of which is over an axle and free to pivot. Each trigger-wheel assembly is linked by a connecting rod to the pressure-wheel assembly 15" to rear.

Since most of load rests on load-bearing wheels, only forward pressure exerted is that from belt. This whole pressure-minimization effect permits accumulation at desired points without shutdown of system. Also, container-damage, line-buckling, and spillage probabilities are lessened.

Pressure-sensing conveyor designed for transportation function is identical to accumulator type with one exception: it has no trigger wheels. Spring-loaded pressure wheels are always in contact with belt. In this unit, direction of flow is reversible.

Both accumulation and transportation units have same belt width. Therefore it is possible to establish a system with these conveyors which incorporates movement, accumulation, transfer, and control.

(Rapistan A-P-C wheel conveyors are product of The Rapids-Standard Co., Inc., 342 Rapistan Bldg., Grand Rapids 2, Mich.)

Check 2341 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Check 2340 opposite last page

HANDLING & PACKAGING

Oscillating screen breaks bridge in hopper

Uses: Breaks up bridging of materials in storage bins, supply hoppers, ducts, containers.

Features: Vibration is not supplied directly to sidewalls of hopper. Relatively small mass of steel is agitated to break the bridge.

Description: Expanded metal screens, installed parallel to lower sections of material hopper, are vibrated at high speed by external double-acting pneumatic piston. This agitates the material and promotes its flow.

Unit is usually supplied as complete hopper with flanged inlet and outlet for attaching to existing bins or ducts. However, screens can be supplied for a customer's hopper on special request.

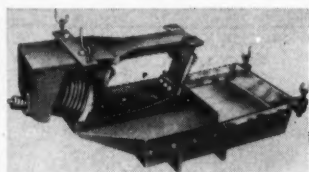
(Bridge Breaker is product of Thayer Scale Corp., Pembroke, Mass.)

Check 2342 opposite last page.

Electromagnetic unit feeds and screens at same time

Uses: Rate-controlled simultaneous screening and feeding of dry bulk materials.

Features: Unit's 3600 vibrations per minute produce sufficient particle agitation to



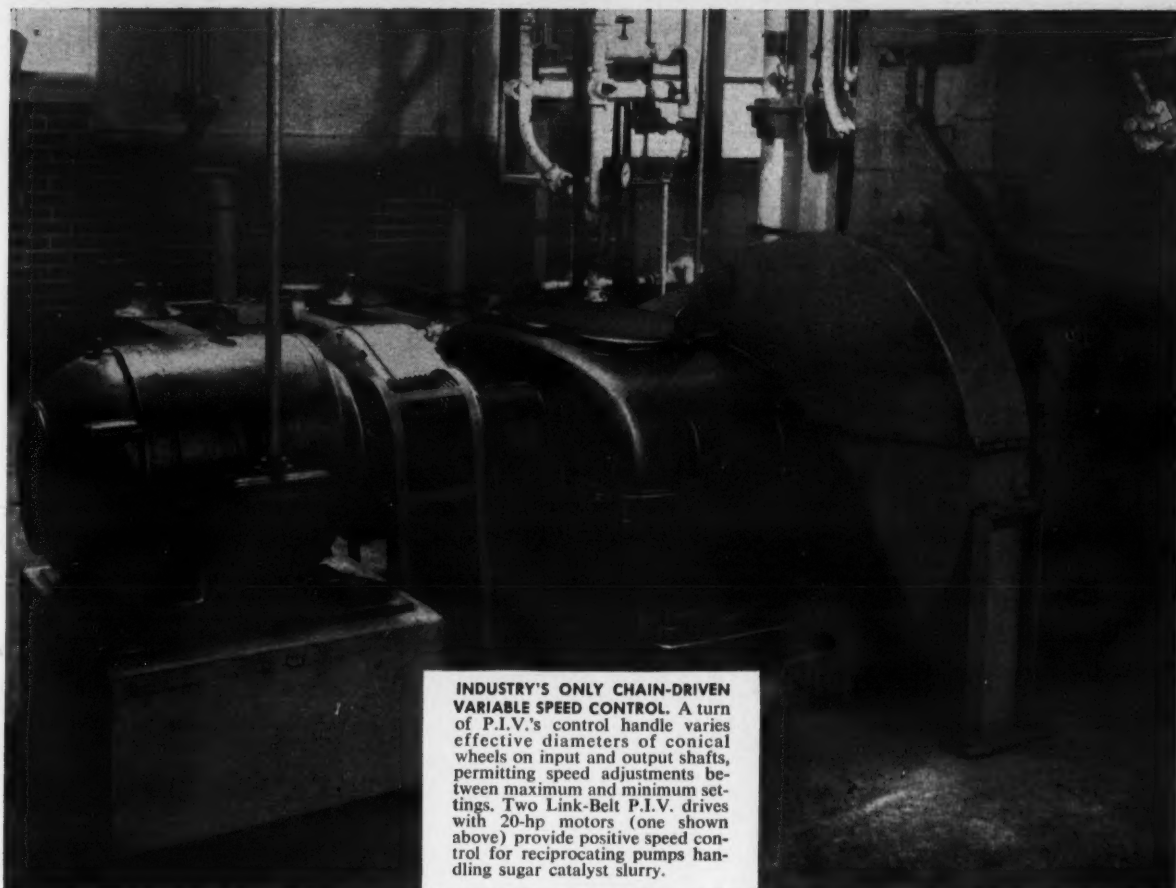
Screens as it feeds

assure fast, efficient separation. Feeding is reported as clog-free.

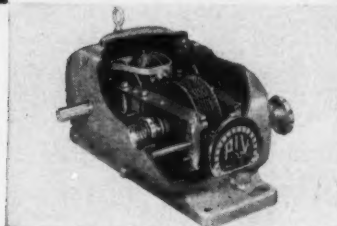
Description: Electromagnetically powered small-capacity unit has finger-tip control of power of vibration.

(SF-115 screening feeder is development of Syntron Company, 110 Lexington Ave., Homer City, Pa.)

Check 2343 opposite last page.



INDUSTRY'S ONLY CHAIN-DRIVEN VARIABLE SPEED CONTROL. A turn of P.I.V.'s control handle varies effective diameters of conical wheels on input and output shafts, permitting speed adjustments between maximum and minimum settings. Two Link-Belt P.I.V. drives with 20-hp motors (one shown above) provide positive speed control for reciprocating pumps handling sugar catalyst slurry.



*Unique
in operation . . .*

*unmatched
in accuracy . . .*

For stepless, slipless speed changing

. . . there's nothing like P.I.V.

Where operations requiring variable speed control can't tolerate slip—no other mechanical drive is equipped for the job like Link-Belt P.I.V. With its all-metal, self-tooth-forming chain that maintains positive grip with radially grooved wheels, it offers a degree of accuracy . . . a level of efficiency—unique in the field. Speeds can be varied in an instant, regardless of load, without interrupting the driven machine. And P.I.V.'s all-metal construction ignores atmospheric conditions.

The complete story is contained in Book 2274. Your nearest Link-Belt office or authorized stock-carrying distributor will supply a copy.

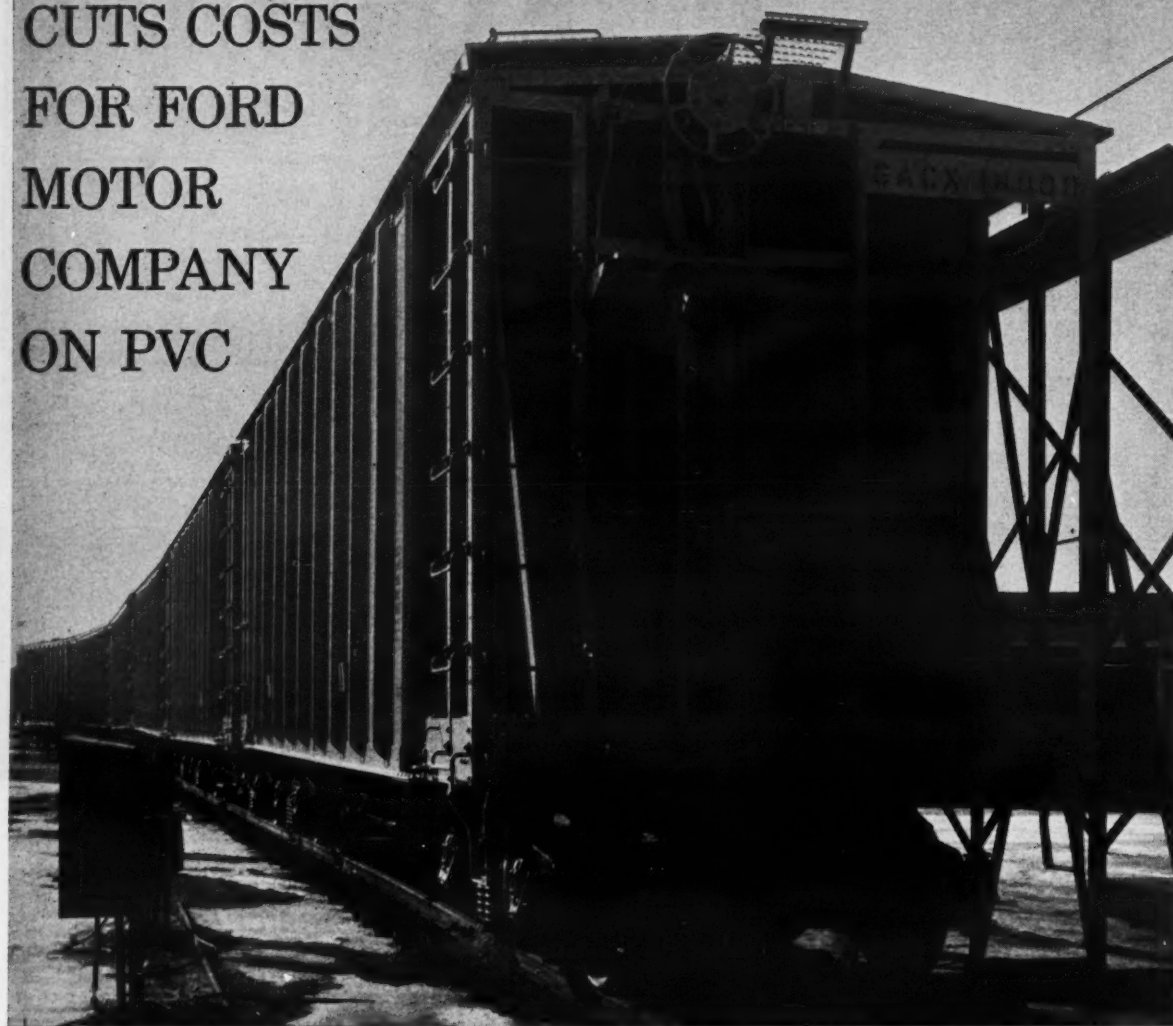
LINK-BELT
P.I.V. VARIABLE SPEED DRIVES

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarborough (Toronto 13); South Africa, Springs. Representatives Throughout the World.

18,058

Check 2344 opposite last page

BULK SHIPPING VIA AIRSLIDE® CARS CUTS COSTS FOR FORD MOTOR COMPANY ON PVC



Producing a better car for the least possible money is a constant challenge to auto manufacturers. To help solve this problem the Ford Motor Company is cutting costs of transporting PVC resin by bulk shipping in Airslide cars.

As a result, Ford not only gets substantial savings, but receives the PVC without in-transit contamination.

The Airslide car is filled by blowing the

resin through one of the top hatches of the car. At the unloading point, low pressure air is used to aerate the PVC and cause it to discharge by gravity. The product is then taken under vacuum through a pipe to storage bins.

If you ship or receive dry granular chemicals in bulk, investigate the advantages of shipping via Airslide car. You'll find it pays to plan with General American.

GENERAL AMERICAN TRANSPORTATION CORPORATION

135 South LaSalle Street • Chicago 90, Illinois

In Canada: Canadian General Transit Co., Ltd., Montreal

Airslide Car Department



Check 2345 opposite last page

HANDLING & PACKAGING

Pushbutton steel strapper plays no size favorites

Uses: Application of steel strapping to packages and/or bundles.

Features: There is no maximum limitation on package size which can be strapped, due to unlimited strap feed and take-up. As few as three small-diameter pipes can be strapped.

Description: Steel strapper is electrically and pneumatically powered. To begin operation, end of strap is inserted in unit and button is pressed. Tension, which has been already selected on dial, is applied to strap. Length of strap is also set on dial and additional length may be fed from floor-operated switch.

Sealed joint is automatically produced and strap is cut adjacent to seal. Seals are fed from coils. There are 3000 to 5000 seals on each coil. Seal coils can be printed in color with trade marks or other identifications.

Strapper fits easily into conveyor. Models are available for strap widths of $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, or $\frac{3}{4}$ ". Strap may be 0.015 to 0.023" gage for any model. Custom adaptations are possible.

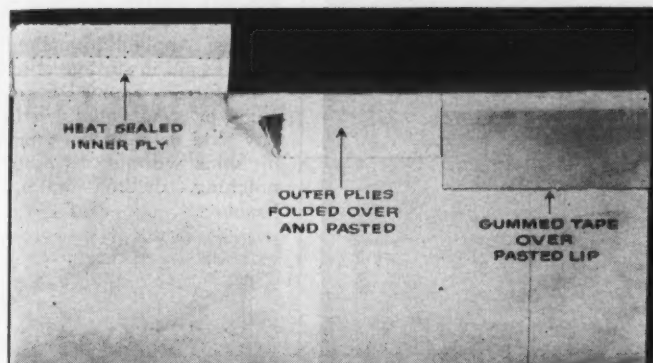
(Model F4 strapping machine is product of Acme Steel Company, 13501 Perry Ave., Chicago 27, Ill.)

Check 2346 opposite last page.



"Take away that flashy polyethylene packaging and what have you got?"

MATERIAL HANDLING and PACKAGING



Here are the three seals, applied in order, on air-tight bag. Note that heat-sealing is done direct on inner ply, not through outer plies

Heat-sealed multiwall bag holds out air, moisture

Offset outer plies permit direct application of heat to top of inner ply

Uses: Packaging hygroscopic, deliquescent, corrosive, semi-liquid, or other hard-to-protect products.

Features: Bag is a completely heat-sealed, liquid- and air-tight package which eliminates problem of excess moisture pickup by product. It was originally designed to have a maximum moisture increase of less than 0.1% per year with a very hygroscopic material. In tests, moisture pickup was zero after six weeks at 100°F and 90% relative humidity.

Description: Designed to hold up to 100 lb, bag is constructed in form of a tube with two to six plies of paper. Inner ply is coated with polyethylene or other heat-sealable material. Depending on product being packaged, plies are made up of various combinations of kraft paper, kraft and foil, or polyethylene-coated kraft and foil.

Bag is unique in that outer plies are staggered or offset,

leaving inner ply exposed to take a direct heat-seal application. Vertical seam and bottom of inner ply are heat-sealed by bag manufacturer.

A special closing machine is used. It heat-seals at 300°F for five seconds on each bag. Original unit, developed for Du Pont, handles six filled bags a minute. However, faster machines are now being designed.

After heat-sealing top of inner ply, closing machine applies adhesive to tops of outer plies. It then folds entire lip over and pastes it to outside of bag so that no pressure is exerted on heat-seal. Simultaneously, the machine adds a strip of 2½"-wide gummed tape, centered over edge of lip.

(Uniseal® bag and closing machine are developments of Union Bag-Camp Paper Corporation, 233 Broadway, New York 7, N. Y.)

Check 2347 opposite last page.

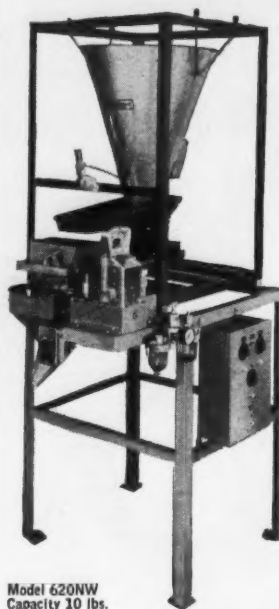
EXACT WEIGHT® Automatic Net Weighing Machines

FOR PACKAGING, BAGGING,
BATCHING, COMPOUNDING

Exact Weight offers:

- Precision industrial-type scale.
- Over-under indicator visual check eliminates need for separate checkweighing operation.
- Calibrated adjustments with counterweights of known value; graduated beam, poise and scale indicator.
- Design backed by 45 years of experience in specialized weighing equipment.
- Readily accessible service and maintenance facilities.
- Performance guaranteed in writing.

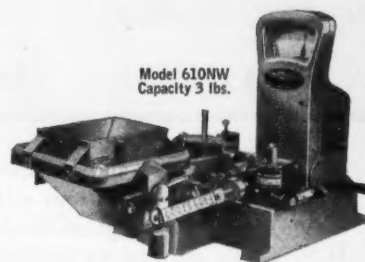
Weighs and feeds any dry, free-flowing materials . . . fast and accurate operation . . . helps cut production costs. Write for Bulletin 3318 for details and specifications.



Model 620NW
Capacity 10 lbs.

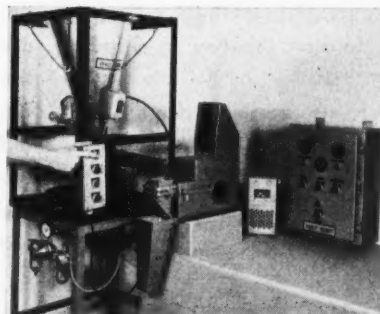
Automatic Net Weigher

Net Weigher can be supplied without the feeder machine, support frame and discharge chute. The unit may be adaptable to your specific operation. Write for Bulletin 3311.



Model 610NW
Capacity 3 lbs.

Precision Automatic Net Weighing Machine



Model 4601 NW, left, for weighing dry products with accuracies of 1/10 gram on quantities below 10 grams and one percent accuracy on quantities of 10 grams and above. Combines a high-accuracy Shadograph Scale, air-operated dump mechanism, hoppers, vibratory feeders and photoelectric controls. Models with capacities from 50 grams to 500 grams. Write for Bulletin 3363.



THE EXACT-WEIGHT SCALE CO.

905 W. FIFTH AVE., COLUMBUS 8, OHIO

In Canada: 5 Six Points Road, Toronto 18, Ont.

Sales and Service Coast to Coast



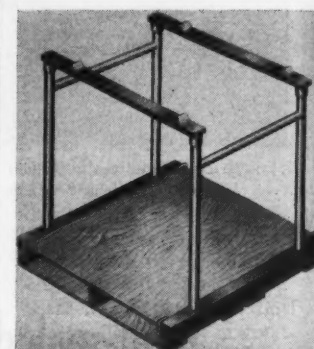
BETTER QUALITY CONTROL . . . BETTER COST CONTROL

Check 2348 opposite last page

Storage stacking frame fits any pallet

Uses: Applied to pallets or skids as aid in storage of loads.

Features: Frame fits any wood or steel pallet, virtually any skid or solid deck pallets or skids without necessity of notching, drilling holes, or



Use of stacking frame eliminates alteration of existing pallets

chiseling. There are no separate parts, and unit can be assembled by one man in seconds.

Description: Unit is shipped and/or stored flat. It slips on or off pallets with ease regardless of load capacity.

(Stacking Frame Model 1095 is manufactured by The Paltier Corp., 1701 Kentucky St., Michigan City, Ind.)

Check 2350 opposite last page.

Elevator conveyor affords continuous, fast bulk loading

Uses: Speeds moving, elevating, lowering of fragile bulk loads.

Features: Elevator conveyor incorporates device which moves trays together into an interlocking bank at loading point. This permits fast, continuous bulk loading of wide variety of materials into the trays. Spillage between trays is eliminated. Loading is said to be performed quickly, sanitarily, without breakage, dusting, or marring.

Description: After trays pass loading point, they are separated again. This provides

"Unloads rail cars in 1/3 less time..."

"... It's fast and has adequate power to get full bucket loads under any conditions existing in our plant", continues D. W. Brant, Plant Supt. of Screven Oil Mill, Sylvania, Ga. "The H-25 is daily proving it's the ideal size machine for all phases of our fertilizer and limestone handling work. We have been using "PAYLOADER" units for 12 years with outstanding, continuous service and low repairs."

If you want top production from a six-foot-turning-radius machine, you should try a Model H-25. In carry capacity, in output, and in proven dependability it has no equal.

Other proven "PAYLOADER" models are also available, from 2,000 to 12,000 lbs. carry capacities, to meet your every material handling need. Your Hough Distributor is ready to serve you. See him today.

Maneuverability and Speed . . .

The H-25 with 2,500 lb. carry capacity, only 6 ft. turning radius and easy power steering, is the most concentrated package of tractor-shovel productivity ever designed. Power-shift transmission with two speeds forward and reverse, power-transfer "no-spin" differential, and 4,500 lbs. of bucket break-out force are other outstanding features that speed production and reduce operator effort.

HOUGH®

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.
744 Sunnyside Ave., Libertyville, Ill.

☐ Send full facts about the H-25 PAYLOADER ☐ Other PAYLOADER Models

Name _____

Title _____

Company _____

Street _____

City _____

State _____

6-A-1

Check 2349 opposite last page

HANDLING & PACKAGING

ample space between them for completely horizontal travel even when elevating, declining, or on turns.

When trays reach unloading area, load is dumped automatically on the run only where dumping is desired. Trays then return quickly to horizontal position.

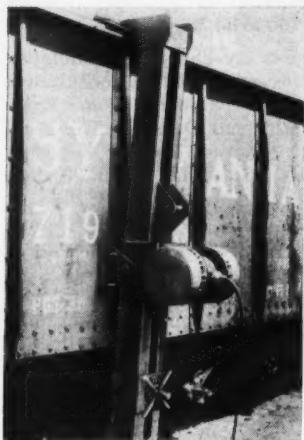
(Econ-O-Lift was developed and is manufactured by the Econ-O-Veyor Corp., 224 Glen Cove Rd., Glen Cove, N.Y.)

Check 2351 opposite last page.

Car shaker reduces hopper unloading time to minutes

Uses: Emptying railroad hopper cars.

Features: Unit reportedly permits bulk materials to be unloaded 10 times faster than conventional manual methods. Rodding and poking are elimi-



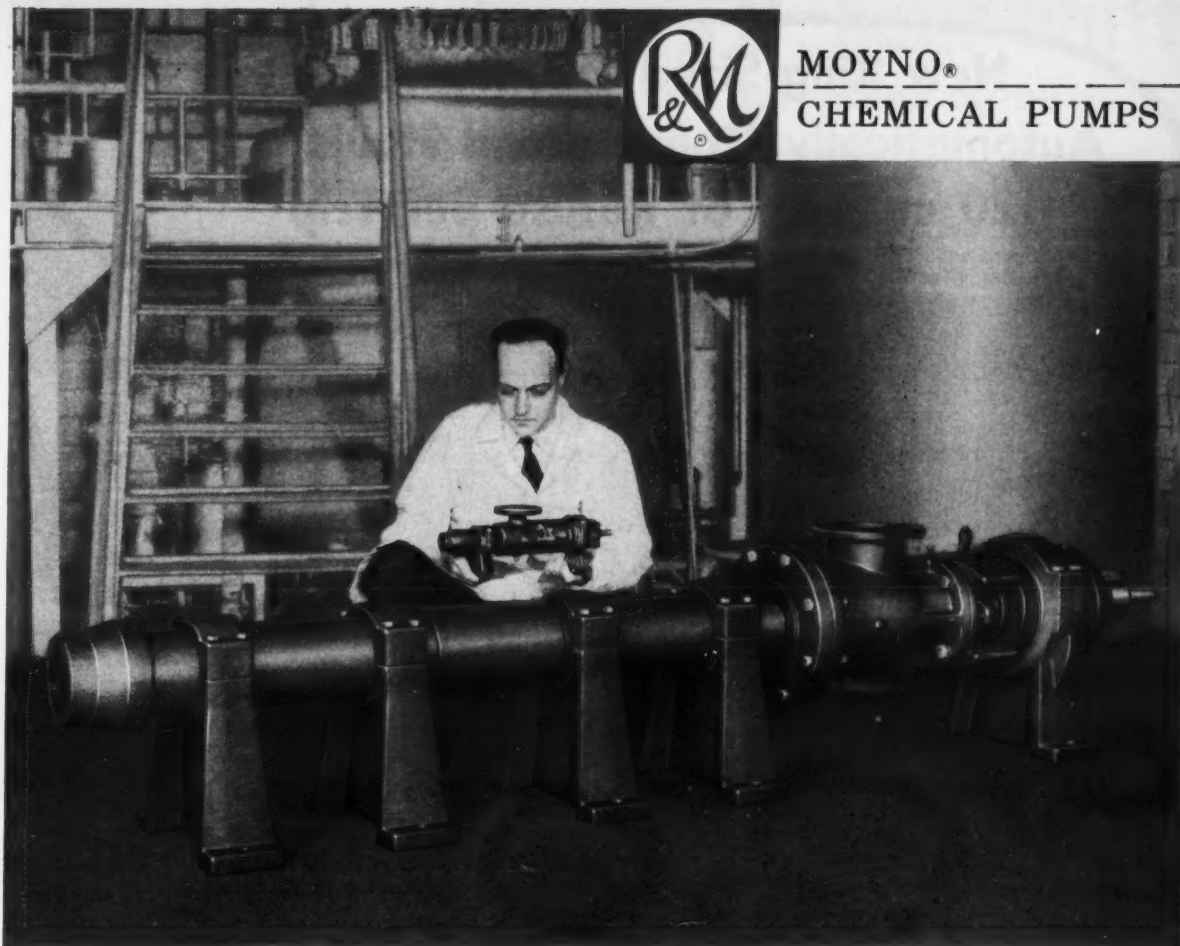
Easy-to-attach car shaker unloads bulk materials 10 times faster than manual methods

nated. Labor and demurrage costs are reduced.

Description: Shaker consists of totally enclosed vibrating motor mounted on hook-type steel frame for easy attachment. Four-hp, self-lubricating motor produces 850 vibrations a minute.

(Syntron-Sinex Shaker is manufactured by Syntron Company, 110 Lexington Ave., Homer City, Pa.)

Check 2352 opposite last page.



MOYNO[®]
CHEMICAL PUMPS

MOYNO PUMPS capacities: from 1/100 to 500 gpm pressures: up to 1000 psi

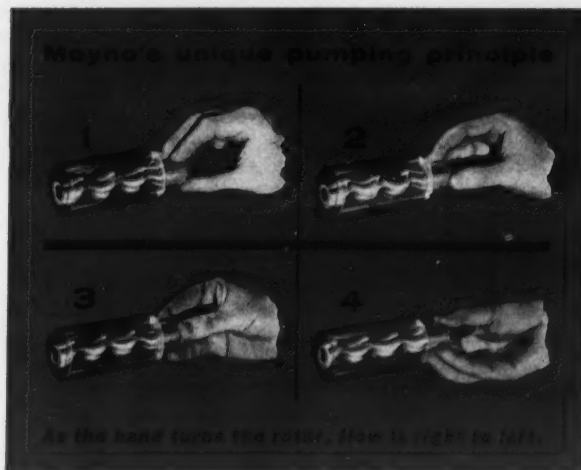


MOYNO pumps are available in nine sizes with capacities ranging from minimum metering flow to 500 gpm and pressures from zero to 1000 psi. Positive displacement delivers

uniform discharge without pulsation, agitation or turbulence. Solutions ranging from thin watery slurry to extremely viscous paste, corrosives, abrasives and even solids in suspension are economically handled without excessive pump wear.

MOYNO's unique "progressing cavity" principle with only one moving part and special resistant internal parts slashes pump maintenance costs on problem chemicals that often ruin other pumps. Almost any substance that can be forced through a pipe can be pumped by a MOYNO.

To learn how a MOYNO can cut your pumping costs, see our product information in *Chemical Engineering Catalog*, or write today for Bulletin 30 CP.



ROBBINS & MYERS, INC.

motors, household fans, Propellair industrial fans, hoists, Moyno industrial pumps
SPRINGFIELD, OHIO • BRANTFORD, ONTARIO

Check 2353 opposite last page

New King-Sized DUMPMASTER Automatically Collects and Hauls Up To 120 cu. yds. of Refuse per Trip



Shown above is the Dempster-Dumpmaster CA30-24DB model which has a capacity of 100 cubic yards of loose refuse material.



Shown above is the CA15-18DB which has a capacity of 72 cubic yards of loose refuse material.

DEMPSTER BROTHERS' Newest Addition Cuts Waste Disposal Costs

The famous DEMPSTER-DUMPMAS-TER 24 DB now has a big brother in the CA60-30DB model. Like the original Dumpmaster, it automatically handles detachable containers in one through six cubic yard sizes. However, it can pick up a gross load of 6000 pounds as compared to the 24DB's 3000 pound capacity.

Another important difference in capacity—the new model can compact up to 120 cubic yards of loose refuse while the 24DB gets up to 100 cubic yards per trip. Like all Dumpmasters, the new 30DB has clearance arms for safety . . . they never pass the cab windows . . . can't injure the operator.

Write today for FREE BROCHURE

The Originator and Only Manufacturer of the

Patents Pending
DEMPSTER BROTHERS
Inc.

**DEMPSTER
DUMPMAS-TER®**
SYSTEMS

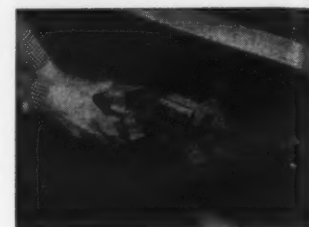


Dept. CP-6

• **DEMPSTER BROTHERS** • KNOXVILLE 17, TENN.

Check 2354 opposite last page

HANDLING & PACKAGING



Charging batteries

. . . of industrial trucks at Caterpillar Tractor's York, Pa., plant has been simplified by utilization of rail-mounted electrical connectors.

Cables are led from charger through sub-floor conduit, along underside of bottom rail of battery rack, and through hole in rail to connector. Connector is screwed to flange which is welded to outside of rail.

System protects cable and maintains shop neatness. It also precludes tripping over loose cables. Battery-charging program has contributed to peak-efficiency operation of industrial-truck fleet.

(Battery-charging installation was developed in consultation with engineers from Exide Industrial Division, The Electric Storage Battery Co., 42 S. 15th St., Philadelphia 2, Pa.)

Vibrating conveyor has 'step-trough' design

Uses: Moving solid granular materials uphill at inclines of 5 to 25 degrees.

Features: Hundreds of small "steps" built into trough of unit catch material on downstroke to prevent it from slipping backward, providing higher capacities.

Description: Equipment is built to resist heat, abrasion, and impact. By combining steel plate trough and manufacturer's Natural-Frequency drive, which has no moving parts or bearings except at the protected, heavy-duty drive, maintenance and downtime are kept at a minimum.

(Mechanical vibrating conveyor is development of Carrier Conveyor Corp., 217 N. Jackson St., Louisville 2, Ky.)

Check 2355 opposite last page.

THAT'S
INTERESTING

**New cancer
surgery aid**

An organic derivative of hypochlorous acid—a form of monoxylchlorosene—is being tested by surgeons as a wash for cleaning cancer wounds after an operation. Tests have shown all cancer cell seedings left in and around wounds are destroyed by the wash. The chemical is not to be regarded as a cancer cure.

**'Flying'
submarine**

So rapidly can the Navy's new nuclear submarine travel and maneuver that crew members below decks must be "strap hangers" to stand up under its fast action. Chain Belt Co.'s *Rex World* reports "Skip-jack" can travel 70,000 miles without refueling. It weighs 2700 tons, is designed like a whale. Pilot and co-pilot ride bucket seats.

For more information on product at right, specify 2356 see information request blank opposite last page.



10 hours' work in an 8-hour shift!

**That's the production advantage of the
Yale Industrial Tractor Shovel**

Here are the features that make the Yale Industrial Tractor Shovel outstanding...

PRECISELY CONTROLLED HORSEPOWER! 72 hp. 6 cylinder engine provides smooth power through matched torque converter and Yale torque transmission (fully automatic). One speed in both directions. Inching control permits delicate close-quarter maneuvering. Extra punch for impact loading. Accelerates to 13 mph. in 5½ seconds.

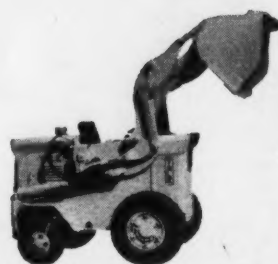
PERFORMANCE! 2500 lb. carry capacity. Exclusive 45° bucket tipback permits faster loading and lowest carry position for faster transport with minimum spillage. 6' dumping clearance permits dumping into bins and hoppers out of range of other—even larger—tractor

shovels. Shortest turning radius, too—only 73".

SAFETY! Safety-curve lifting mechanism—members never rise alongside the operator. Front and back working lights provide extra security.

DEPENDABILITY! Rugged design • sealed brakes and electrical system • protected steering linkage • 10 ply tires—all adds up to more work at less cost...more production hours. Full range of buckets and attachments available.

Field applications prove that these features add up to 25% more work per hour—10 hours' work in an 8-hour shift. For a demonstration in your plant or complete information contact your Yale representative. Or write The Yale & Towne Mfg. Co., Yale Materials Handling Division, Phila. 15, Pa., Dept. YT 2-V.



YALE
INDUSTRIAL LIFT TRUCKS
TRACTOR SHOVELS • HOISTS
YALE & TOWNE

Yale Materials Handling Division, a division of The Yale & Towne Manufacturing Company. Manufacturing Plants: Philadelphia, Pa., San Leandro, Calif., Forrest City, Ark. Products: Gasoline, Electric, Diesel and LP-Gas Industrial Lift Trucks • Worksavers • Warehouse • Hand Trucks • Industrial Tractor Shovels • Hand, Air and Electric Hoists

AUTOMATIC MARKING SAVES MONEY



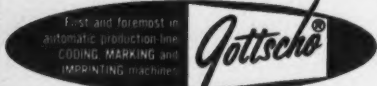
New ROLACODER conveyor and case-sealer attachment marks boxes, cartons, drums, filled bags automatically

Saves on container printing costs... eliminates hand-stamping... insures faster identification

- Low-cost... pays for itself in months
- Compact... works by friction... requires no troublesome adjustments
- Install it yourself on any conveyor, case-sealer, etc. to mark from side or top
- Not a gadget — beautifully designed and precision-made to give consistently dependable performance, uniform impressions
- Patented type base holds type and dies securely, makes copy changing easy
- Spots imprints accurately in any desired location
- Many thousands in use by all industries

Models to suit every need... including twin-action units for marking 2 or 4 sides of cases simultaneously.

Write today for Bulletin "ROL-3"



GOTTSCHO Dept. W
HILLSIDE 5, N.J.

In Canada: Richardson Agencies, Ltd. • Toronto & Montreal

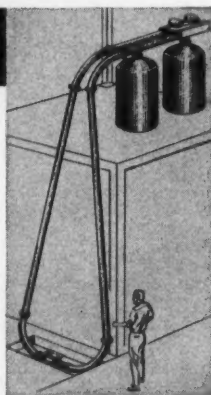
Check 2357 opposite last page

Hapman TUBULAR CONVEYORS for Bulk Material Handling

Move almost any flowable material wet or dry — through any plane or angle

Sealed Pin Chain Design Keeps Abrasives Out — Quadruples Chain Life

- Sealed casing retains liquids, gases, powders
 - Basically self supporting, self feeding, self cleaning
 - Degradation and cross contamination minimized
 - Multiple discharge and receiving points
 - Minimum space required for installation
 - Functions as volumetric feeder
 - Low maintenance and operating costs
 - Wide range of materials available for fabrication
- ...each application engineered for your needs.

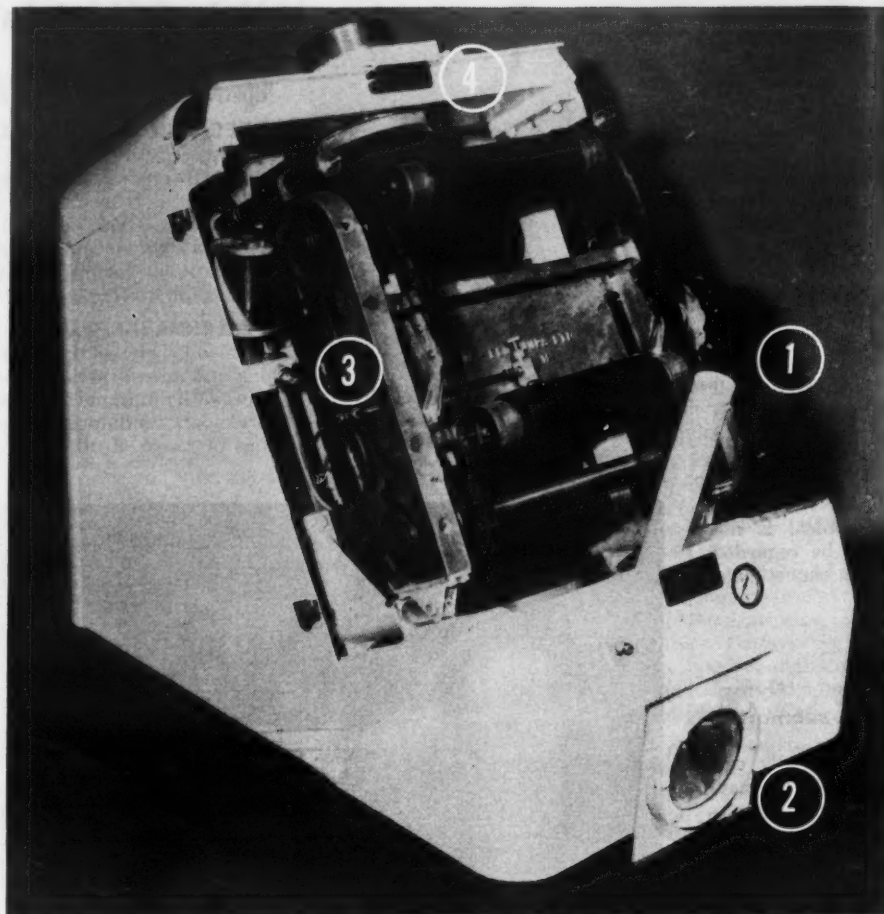


For additional information call... write... wire



Check 2358 opposite last page

MATERIAL HANDLING and PACKAGING



Low-hp pneumatic conveyor moves dense stream

Solids: air ratio of 800:1 precludes need for dust collection units

Uses: Dense-phase pneumatic conveying of granular solids such as low-density chemicals, wood flour, cement, granulated sugar, and starches.

Features: Unit has low horsepower requirements. For conveying materials of 32 lb/cu ft density through 1½" pipeline, only ½ hp/ton/hr is necessary.

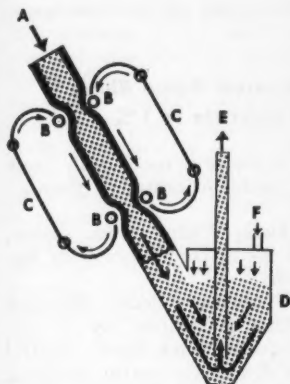
Since material is moved in dense phase (800:1 solids-to-air ratio by weight), air requirement is very low. There is nor-

mally no need for dust collection equipment. Design of pump virtually eliminates blowback.

Description: Material must be partially fluidized prior to entering conveyor pump. One method of accomplishing this is utilization of manufacturer's aeration-pad floor panels in container from which material is fed into pump.

Air, introduced through channels under the urethane-foam pad, flows upward

Opposing rollers on chains are operated by chain drive (1) to move material down tube into pressure chamber which has glass window (2) for observation of material. Oil passes through tube (3) to automatically lubricate pump tube which is rotated by gear (4) to equalize wear



Granular material from a low-pressure zone enters upper end (A) of flexible neoprene-coated nylon-fabric pump tube.

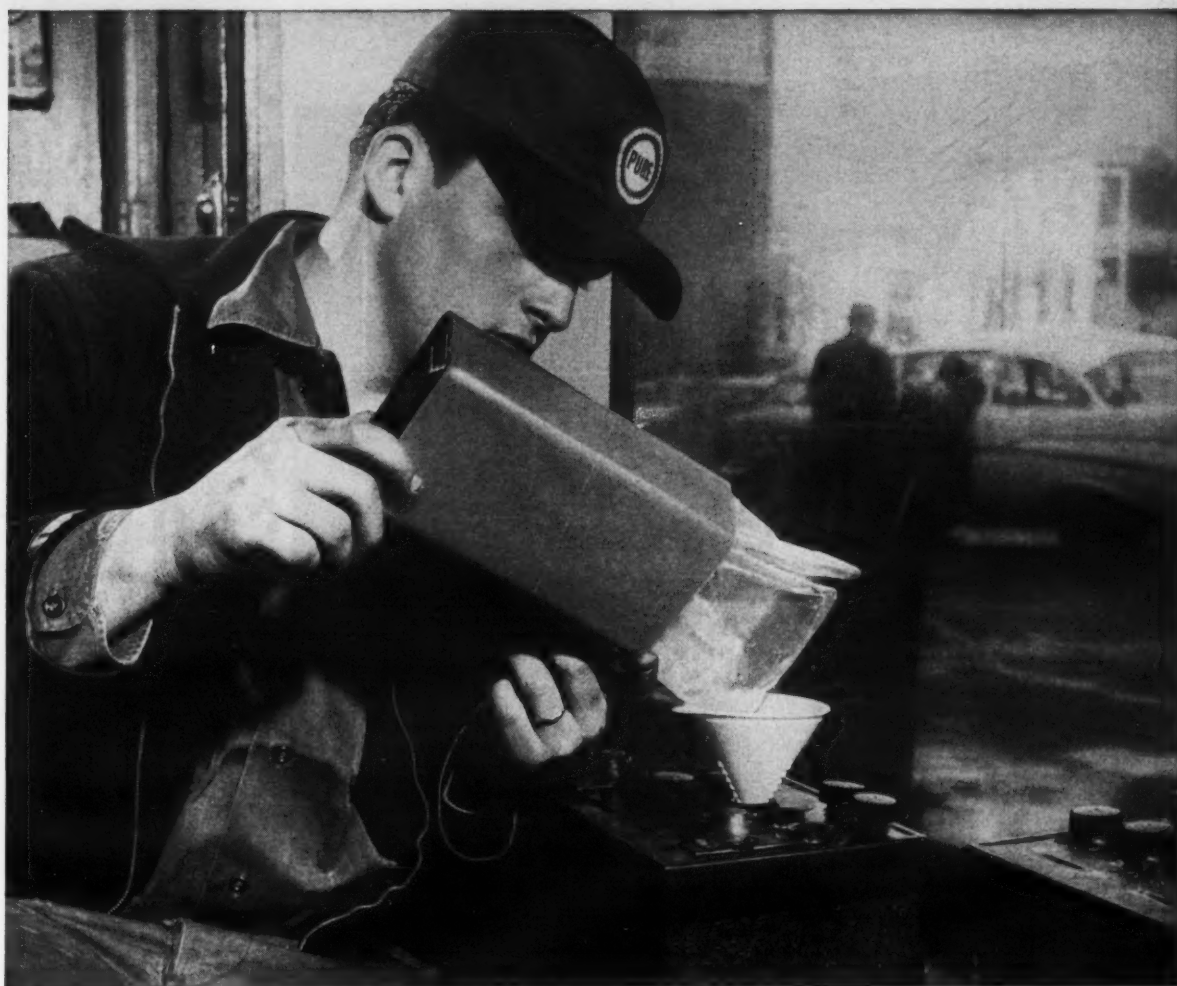
Opposed rollers (B), moved by chain drive powered by three-horsepower 220v 60-cy AC motor, pinch off tube to form pocket. As roller chains (C) revolve, pocket of material moves down tube and into dispatch chamber (D).

Material is then forced up into small-diameter conveying line (E) by high-pressure (12 to 20 psi) air entering chamber by inlet tube (F).

through it to fluidize material on top. A short conveyor section, incorporating the same principle, can also be used to feed the pump.

Only 4.25 cfm of standard air at 16 psi is required to move $7\frac{1}{2}$ tons/hr of flour through a $1\frac{1}{2}$ " conveying line. This requires $2\frac{1}{2}$ hp from motor and $1\frac{1}{4}$ hp from air. Due to low degree of fluidization of material in conveying line, actual line velocity is low. This permits use of flexible polyethylene tube for line.

During operation of unit, pump tube is constantly rotated and automatically oil-lubricated to equalize wear. Depending on degree of use per day, the replaceable tube



How to ship battery acid in a cardboard box!

Battery manufacturers have long known of the economics to themselves and dealers of shipping dry charged batteries. Now, thanks to VISQUEEN "L" film, this is an accepted method.

The "L" film, made only by VISKING Company, and first used in the Navy's stratosphere balloons, is as pinhole free as a polyethylene film can be. It made the perfect liner for cardboard packages designed to contain exactly the right amount of acid for a given battery.

Result—acid shipped at minimum cost and loss. When

the acid is added to the dry charged battery it is in perfect condition and fully charged at the moment of sale.

If yours is a difficult product to store or ship, VISQUEEN "L" film may be the answer. But be sure you get VISQUEEN film. Don't be fooled. No other film is as uniform, as free from thin spots and blemishes, as VISQUEEN film.

Write for full information about VISQUEEN film and your product, or use the Information Request Tag.



VISQUEEN film—first and foremost polyethylene film.

A product of the long experience and outstanding research of

PLASTICS DIVISION

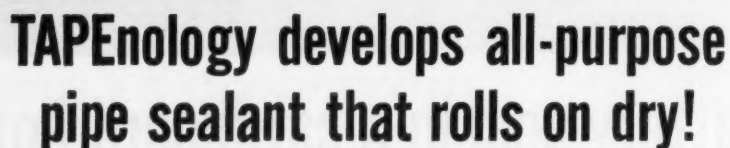
VISKING COMPANY Division of UNION CARBIDE Corporation.

6733 West 65th Street, Chicago 38, Ill.

In Canada: VISKING COMPANY DIVISION OF UNION CARBIDE CANADA LIMITED, Lindsay, Ontario.

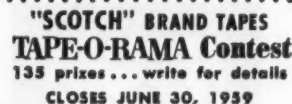
VISQUEEN, VISKING and UNION CARBIDE are registered trademarks of Union Carbide Corporation.

Check 2359 opposite last page



—“SCOTCH” is a registered trademark for the pressure-sensitive adhesive tapes of 3M Co., St. Paul 6, Minn. Export: 39 Park Ave., New York 16, Canada: London, Ontario.

...WHERE RESEARCH IS THE KEY TO TOMORROW



Check 2363 opposite last page.



One-piece sewn-bottom

... asphalt carton speeds filling, reduces leaks, and resists adverse weather. Manufacturer's joint is glued-over-lap type; bottom is string-sewn at his plant. Silicone release compound is inside the 100% solid virgin kraft board container, which has 0.030 thickness.

Carton is supplied flat. To set up, it is slipped over a mandrel, and the "ears" of sewn bottom are folded in and held in place by single wire stitch. Carton rounds out when filled, for easy rolling.

(The 100-lb asphalt carton and simplified set-up machine for it are described in four-page brochure issued by Gaylord Container Corporation, Division of Crown Zellerbach Corporation, 111 N. Fourth St., St. Louis 2, Mo.)

Check 2364 opposite last page.

Unusual maneuverability

... is feature of recently introduced sit-down, rider-type electric lift truck which has 5000-lb capacity and is able to operate in narrow aisles. Measuring 73¾" from rear of counterweight to face of forks, truck can right-angle stack comfortably in 10'4" aisle.

Lifting speeds are 45 to 50 fpm unloaded, and 25 to 30 fpm under load. Unloaded travel speed is 6 to 6½ mph; loaded, 5½ to 6 mph. Four speeds forward and four reverses are controlled by a time delay control.

(K51W 5000-lb-capacity electric lift truck is manufactured by Yale Materials Handling Div., The Yale & Towne Mfg. Co., 11,000 Roosevelt Blvd., Philadelphia 15, Pa.)

Check 2365 opposite last page.



ALLEN-BRADLEY Solenoid Starters give

MORE MILLIONS OF TROUBLE FREE OPERATIONS

... and for good reasons

• ONE MOVING PART

With this simple solenoid design, there's virtually nothing to go wrong—all trouble—causing bearings, pivots, and flexible jumpers have been eliminated.

• DOUBLE BREAK, SILVER ALLOY CONTACTS

Allen-Bradley silver alloy contacts never require maintenance. They are always in perfect operating condition... and remain so until completely worn away.

• SIMPLE UP-AND-DOWN MOTION

The virtually frictionless, straight line vertical motion provides uniform contact pressure at all times—and assures consistent, rapid operation of the contactor.

• RELIABLE OVERLOAD PROTECTION

All A-B starters are equipped with two permanently accurate and reliable overload relays that protect motors against "burnouts." Three overload relays can be furnished.



**BULLETIN 709
STARTERS**
are made in 9 sizes
from Size 0 (at left)
up to Size 8.

BULLETIN 709 SIZE 7
with maximum ratings of 300
hp, 220 v; 600 hp, 440-550 v.

ALLEN-BRADLEY

**QUALITY
MOTOR
CONTROL**

Check 2366 opposite last page



Only BAGPAKS® have a built-in insurance policy backed by International Paper

ACCIDENTS like this *will* happen. That's why International Paper plans for extraordinary stresses and strains when designing its Bagpak multiwall bags.

Only genuine *Gator Hide*® kraft, famous for toughness, is ever used in making Bagpak multiwalls. Quality is controlled every step of the way. International Paper can do this because it grows its own trees, makes its own paper, converts it into printed multiwall bags to your order. It also designs and builds *Bagpaker*® machines that

can package up to 60 tons of material per hour!

When you buy Bagpak multiwall bags you get speedy shipments geared to your production schedules. *Twenty-one* sales offices and four strategically-located plants save you money by keeping your inventory at a minimum.

Only Bagpak multiwalls are backed by the full resources of International Paper—world's foremost pulp, paper and paperboard producer.

Next time your Bagpak field service engineer drops by, ask him what's new. He knows.



Bagpak Division **INTERNATIONAL PAPER** New York 17, N.Y.

LOST YOUR SLIDE RULE?

Then CP's Processing and Engineering Data Section is for you!

Each month, this section contains time-saving nomographs, tables, or charts which other data savers have found extremely useful in speeding calculations. Perhaps, you will find them to be of value to you.

A wide variety of information can be found in this section. So no matter what your particular field you will find suitable data to aid you in your daily work.

And —

the section pages are designed to fit easily into regular data files.

Keep them handy for use in making quick calculations in the plant or office.

Just cut along the marked edge, punch as indicated, and insert them into your notebook.

So —

be sure not to miss this month's "Data" Section. It begins on page 69.

For more information on product at left, specify 2367 see information request blank opposite last page.



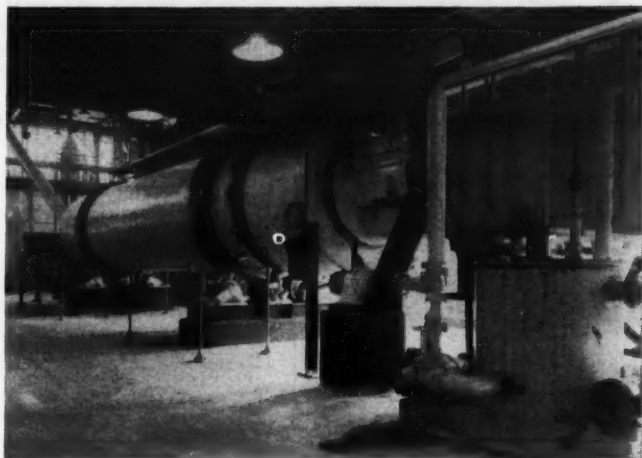


**PROCESSING
EQUIPMENT**



Outlet end of rotary resin dryer

Inlet of resin dryer. Hot air and centrifuged 15%-moisture resin particles enter here



Controlled-temperature resin drying . . .

puts heat on shipping costs

**Steam-heated rotary unit handles
1800 lb product per hr**

Problem: Desirability of drying water-suspended resins to be made by a large southwestern chemical plant was complicated by the fact that resin would be damaged above 120°F. Exact temperature control was mandatory.

Shipping resin, which is vinyl chloride copolymer, in suspension would be costly due to freight charges paid on water weight, packing limitations, and erratic customer-

receipt weight caused by uncontrollable evaporation.

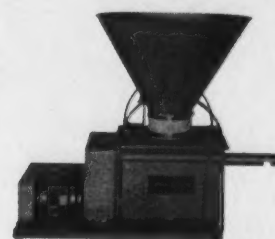
Solution: Centrifugal system and rotary dryer were installed to remove the water when plant went on stream in September 1958. Design of dryer permits shorter overall length.

Resin slurry is first de-watered by centrifugal so that water content is about 15% at dryer inlet.

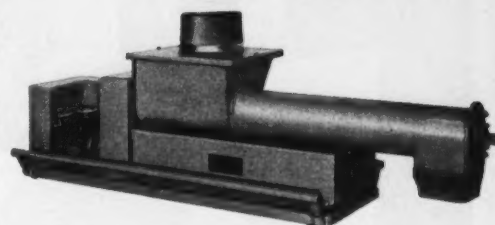
Using dryer's air-flow system as conveying method,



Which Bulk Feeder?



Standard Volumetric?



Feeder-Conveyor Volumetric?



Gravimetric?

Exclusive VIBRA SCREW® has ALL THREE

Now the exclusive Vibra Screw principle — combining vibrated screw rotation with vibration of hopper, trough and tube — is now available in a new gravimetric feeder and a heavy duty feeder-conveyor with the same unmatched accuracy for precise feeding of dry materials as the original VIBRA SCREW volumetric feeder.

All three are capable of handling a wide range of different and difficult substances, but each is designed to meet requirements of a specific feeding problem. Consider these facts about each one:

STANDARD VOLUMETRIC — For handling all materials, free flowing or sticky, at minute-to-minute accuracy in capacities from ounces to tons per hour.

FEEDER-CONVEYOR VOLUMETRIC — For heavy duty service in horizontal conveying as well as feeding from supply pipe or hopper at tonnage rates in screw lengths up to 20 feet.

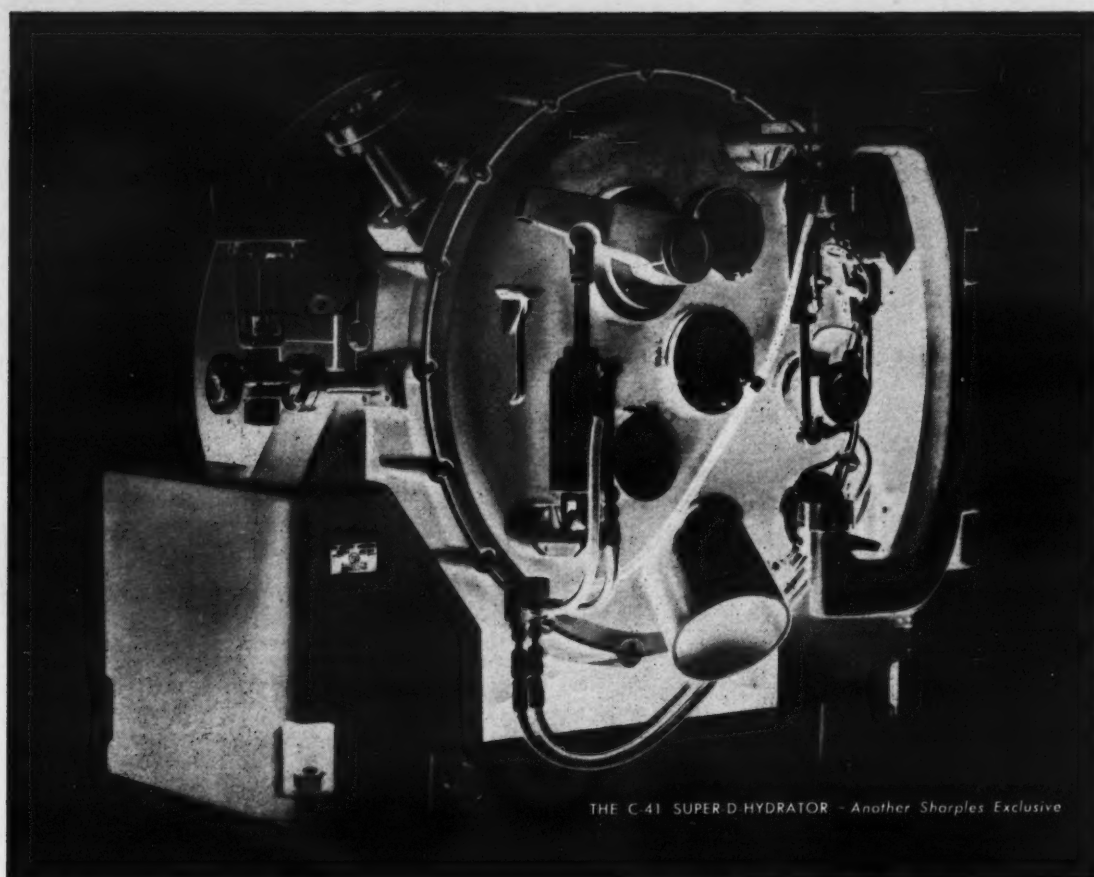
GRAVIMETRIC — For delivering weighed batches directly into process at timed intervals in quantities down to one ounce and frequencies variable up to 4 per minute. These intermittent charges can be converted into a self-adjusting, continuous weight-controlled stream, by using a third screw which continuously rotates and vibrates.

Want more information? Write today for literature. Or better still, send us details of your dry materials handling problem.

VIBRA SCREW FEEDERS, INC.

156 Huron Avenue, Clifton, New Jersey

Check 2368 opposite last page



THE C-41 SUPER-D HYDRATOR - Another Sharples Exclusive

"CHEMICAL TREATMENT" under High Centrifugal Force

In the dewatering of polyolefin "crystals" it is generally necessary to apply one or two separate rinses to the cake; each rinse liquor being selected carefully to perform a calculated function to insure final high purity of the product.

These rinses, which in effect are carefully controlled chemical treatments, take place under high centrifugal force, and in most cases with the entire "system" pressurized at 10 to 15 psi.

All conditions pertinent to these rinses (duration, frequency, amount and type of rinse liquor, etc.) as well as loading, drying and unloading operations are automatically controlled, and may be adjusted or changed as desired during operation without interrupting production. Capacity of the C-41 Super-D-Hydrator on typical polyolefin dehydrations generally ranges from 2000 lbs/hr. to around 6000 lbs/hr.

Sharples engineers have incorporated many innovations in the design of the new C-41, learned in over 40 years experience in the chemical industry, and are further prepared to give special design consideration to each specific problem. May we consult with you regarding your separation problems?

The new Super-D-Hydrator Bulletin Number 1286 will be sent upon your request.

THE SHARPLES CORPORATION
Centrifugal and Process Engineers
2300 WESTMORELAND STREET / PHILADELPHIA 40, PENNSYLVANIA
NEW YORK • PITTSBURGH • CLEVELAND • DETROIT • CHICAGO • HOUSTON • SAN FRANCISCO • LOS ANGELES • ST. LOUIS • ATLANTA
Associated Companies and Representatives throughout the World

Check 2369 opposite last page

PROCESSING EQUIPMENT

damp resin particles are blown through dryer chamber into cyclone separator. Inlet temperature is 320 to 325°F and outlet temperature is 140 to 150°F.

Heated air and material flow parallel through dryer. Knockers, attached to ¼" stainless-steel casing, jar any clinging resin loose from walls of chamber cylinder.

Dried resin then goes to storage bins, from which it is bagged in 50-lb sacks.

Air is heated to about 320°F by steam coils supplied with steam from plant's 150-psig, 340°F steam supply. Dryer's air-flow system is rated at 4200 cfm free-air flow. Resin particles average approximately 50 microns. Drying chamber is 35' long and has 6' diameter. It rotates at 6 rpm.

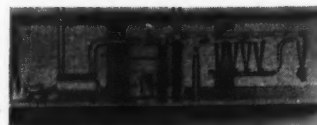
Results: Resin is dried to moisture content of less than 1% under conditions which do not harm it. Dryer's hourly production capacity is 1800 lb of resin. Little maintenance other than greasing has been required.

(Dryer is a product of Louisville Drying Machinery Unit, General American Transportation Corp., 135 S. LaSalle St., Chicago 90, Ill.)

Check 2370 opposite last page.

Charring eliminated in spray drying

Spray dryer overcomes hot spots and charring within drying chamber. All piping and hot surfaces are eliminated. Vacuum system removes all of dried product continuously. Comparatively flat bottom of



Spray dryer overcomes hot spots

drying chamber requires less installation space and permits easy cleaning.

Dryer is available in laboratory and production models. Steam-heated and oil-fired types are used in food and

PROCESSING EQUIPMENT

drug processing. High-temperature, combination gas and air system is utilized in drying of chemical and industrial products.

(Tower-Anhydro spray dryer is a product of Tower Iron Works, Inc., Providence, R.I.)

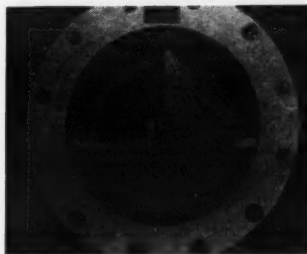
Check 2371 opposite last page.

Pressure-leaf filter jet gives greater velocity with same flow

Recently developed spray jet permits more rapid cleaning of filter leaves with less amount of cleaning medium.

Nozzle provides double-acting fan-shaped jet streams to clean front of one leaf and back of other at same time.

Nozzle is equipped with ring by which width of spray is confined to increase force of spray. This results in



Pressure-leaf filter jet permits more efficient spray-down of leaves

greater velocity with same flow. Accordingly, as much as 80% less cleaning medium and time are required.

Testing has indicated that three revolutions of leaves, taking one minute, remove all but most tenacious materials.

(Pressure-leaf filter jet is product of Hercules Filter Corp., 218 Ethel Ave., Hawthorne, New Jersey.)

Check 2372 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Another Exacting Job

for the

VERTICAL MILL



Now working with industry on today's newest developments, the Raymond Vertical Mill is serving manufacturers in the production of solid rocket propellants.

Since this unit is designed for pulverizing to extreme fineness and uniformity, it does an excellent job in grinding the ammonium nitrate and ammonium perchlorate oxidizers to the required specifications.

Outstanding features of the Vertical Mill are:—

1. Ability to meet exacting particle size distribution requirements for proper burning rate and molding qualities.
2. Easily adjusted for a wide range of product fineness.
3. Quick and complete accessibility for adjustments, clean-out or maintenance.
4. Trouble-free operation with no over-heating of product.
5. Automatic and dust-free operation.
6. Compact layout and flexible installation.

One company has already been using the Raymond Vertical Mill for over two years, and has obtained excellent results on ammonium nitrate and perchlorate. Raymond mills have also been used for many years on the potassium chlorate, perchlorate, and nitrate oxidizers.

Write for data on special applications of the Raymond VERTICAL MILL, and ask for Bulletin No. 78

Interior View of Raymond 18" Vertical Mill

COMBUSTION ENGINEERING, INC.

Raymond Division

1116 W. BLACKHAWK ST.
CHICAGO 22, ILLINOIS

SALES OFFICES IN PRINCIPAL CITIES

Combustion Engineering-Superheater Ltd., Montreal, Canada

Check 2373 opposite last page

if it's
done
better
with
spray
nozzles -

better best

it will be done best with
SPRAYING SYSTEMS CO.
SPRAY NOZZLES

HERE'S WHY:

1. You have a complete choice of **design types** to give the exact spray characteristics required.
2. You have thousands of **capacities** to choose from... for more exact volume control.
3. You have a complete choice of **materials** for chemical compatibility.

Your inquiry is invited.





SPRAYING SYSTEMS CO.
3216 Randolph Street
Bellwood, Ill.

For complete spray nozzle information
write for Catalog 24.

Check 2374 opposite last page



FILTER MATERIALS

To Meet Your
Processing
Requirements

- **FILTER PAPER** quickest service, latest converting equipment and most complete range of grades guarantees filter paper to meet any requirements. **SAMPLES FURNISHED** for testing... or send us your materials for testing.
- **FILTER CLOTH** cotton, wool felt, glass, Orlon, Nylon, silk, Dacron, polyethylene, Filyon, Saran and other synthetics cut and sewn to required shapes and sizes... variety of weaves, weights, finishes.

We invite your inquiries



FILPACO INDUSTRIES
THE FILTER PAPER CO.

2432 S. Michigan Avenue, Chicago 16, Illinois

Check 2375 opposite last page

PROCESSING EQUIPMENT

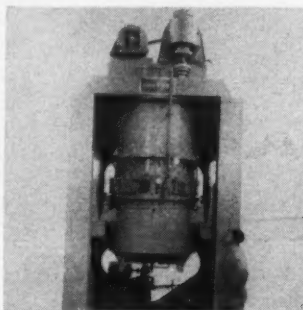
Vertical planetary mixer has no stuffing glands in mixing section

Cuts contamination danger

Uses: Although designed primarily for processing solid propellants, unit is also suitable for mixing other products, especially those that are abrasive, easily contaminated, or those that must be compounded in a vacuum.

Features: Stuffing glands in the mixing area are completely eliminated. Since there are no glands, batch contaminations due to feedback is prevented.

Description: Heavy-duty, vertical, planetary mixer is 22 ft high and is powered by 40



Giant mixer is 22 ft tall, has working capacity of 150 gallons

hp motor. Motor and speed reducer are mounted on top. All gears are pressure-lubricated.

Mixing is performed in stationary stainless steel chamber, having 150-gal working capacity. Mixing chamber is jacketed for circulating water or steam at 80 psi. Actual mixing is done by double-planetary motion, with two stainless steel agitator blades operating at differential speed of 2 to 1.

Mixing chamber can be lowered or raised hydraulically for between-batch cleaning. It can also be charged through ports (in front or back) without being lowered. As safety feature, mixer is equipped with blowout ports.

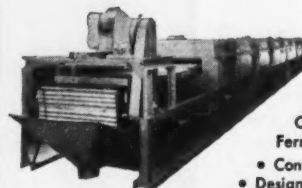
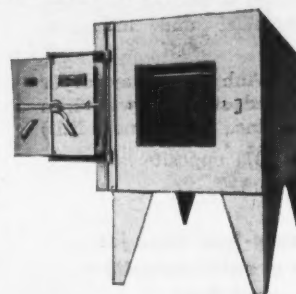
(Heavy-duty, vertical, planetary mixers are product of Chemical Machinery Division of Baker Perkins Inc., 1030 Hess, Saginaw, Michigan.)

Check 2376 opposite last page.

ELECTRIC FURNACES

Uniform, Controlled Heat to 2700°

ANNEALING FURNACES specially designed for Glass and Steel applications in production and laboratory. Temperature range up to 1400°F.



CONVEYOR FURNACES for Glass Annealing, Baking Resistors, Ceramic Molding, Chemical Drying, Annealing Ferrous and Non-Ferrous Metals.

- Controlled Heat up to 1850°F.
- Designed and Built to Your Specifications!

WRITE FOR
BULLETIN 75-TC.

TRENT INC.

Electrically Heated Industrial Equipment
235 LEVERINGTON AVE., PHILADELPHIA 27, PA.
In Canada Supreme Power Supplies Limited, Toronto 14

Check 2377 opposite last page

What's A "New Solution"?

It's an article in **CHEMICAL PROCESSING** describing a new way of solving a tough plant operating problem. In each issue you will find specific "case histories" showing how these processing problems were solved.

Each article states the operating problem... explains the process used and gives details of how problem was solved... shows results secured.

Take a look at "New Solutions" articles in this issue — they might suggest a "solution" for some of your tough processing problems.

THAT'S
INTERESTING

**Prefab
roads**

Autoists in the Stuttgart, Germany, area don't have to wait for concrete to dry before driving on new roads. Eight-inch-thick concrete surfacing blocks are cast in a factory, hauled to road site, fitted over a prepared bed, and covered with asphalt. Blocks are made while old road surface is being removed and leveled and bitumen-gravel sub-surface is being laid. It is estimated, Armour Research Foundation's Industrial Research *Newsletter*, says, that four to five weeks' construction time is saved, traffic delays are reduced, and length of detours cut.

**Specialists,
please note**

Mechanical engineering curriculum at Lehigh University has been changed to provide emphasis on engineering science rather than specialization in one field.

For more information on product at right, specify 2379 see information request blank opposite last page.



SCOPE in INDUSTRY
SPECIALIZATION from...

ALLIS-CHALMERS

**an "Outside Story" about
Allis-Chalmers products**

Self-protection against weather is built into a variety of Allis-Chalmers products — electrical or mechanical. This "Outside Story" through a broad range of A-C equipment (and only A-C offers such a scope of outdoor products) *eliminates the need for costly protective enclosures in many operations.*

Pumps, motors, compressors, mechanical drive equipment, control and switchgear with inspection alleys — all are designed to perform 'round the calendar while exposed to the elements.

For single-source availability of a tremendous scope of up-to-date equipment, designed for outstanding quality control, contact your A-C representative. Or write Allis-Chalmers, Milwaukee 1, Wisconsin.

Products for the Chemical Industry: Electrical Generation and Distribution Equipment; Pumps (rotary vacuum and centrifugal); Compressors; Motors and Control; Mechanical Power Transmission Equipment; Processing Machinery (mills, kilns, screens, etc.); Water Conditioning Systems, plus Materials Handling Equipment.



A-5917-C

Titanium Fabrication

AND HARD-TO-WELD METALS

*Our
Specialty*

**Struthers
Wells**

COMPLETE

FABRICATION, WELDING, MACHINING,

STRESS-RELIEVING AND ASSEMBLY FACILITIES

Struthers Wells has pioneered in the fabrication of titanium almost since its inception. Struthers Wells has the facilities and "know-how" to form and weld titanium as well as zirconium, high chrome-nickel-moly alloys, stabilized stainless steels and many other alloys.

The tube bundle illustrated is installed in a kettle type reboiler shell. Ten duplicate units were furnished. Over seven miles of titanium tubing were required for these units, and titanium has been used to line the high pressure tube side including tube sheets, channel, channel cover and floating head cover. Special titanium flow baffles have been installed in the channel and floating cover to prevent drop out of solids from the corrosive slurry.

When your needs involve any of the difficult metals, turn to Struthers Wells for recommendations and quotations.

STRUTHERS WELLS CORPORATION

WARREN, PA.

Plants at Warren, Pa. and Titusville, Pa.

Representatives in Principal Cities

PROCESSING EQUIPMENT DIVISION

Crystallizers . . . Direct Fired Heaters . . .
Evaporators . . . Heat Exchangers . . . Mix-
ing and Blending Units . . . Quick Opening
Doors . . . Special Carbon and Alloy
Processing Vessels . . . Synthesis Converters

BOILER DIVISION

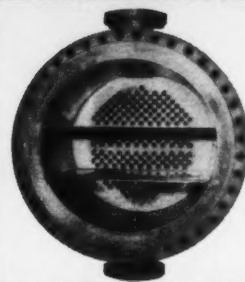
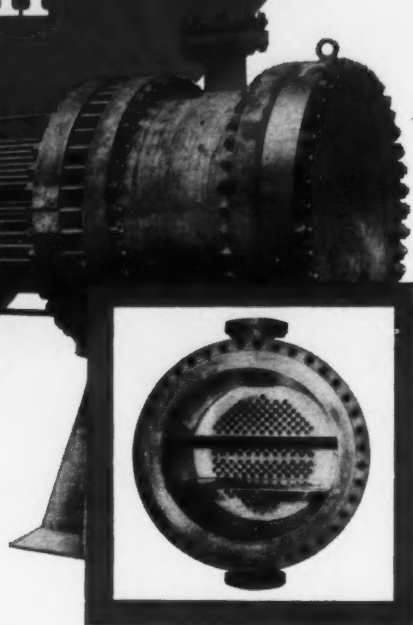
BOILERS for Power and Crankshafts . . . Pres-
sure Vessels . . . Hy-
draulic Cylinders . . .
Shafting . . . Straight-
ening & Back-up Rolls

FORGE DIVISION

Crankshafts . . . Pres-
sure Vessels . . . Hy-
draulic Cylinders . . .
Shafting . . . Straight-
ening & Back-up Rolls



Special inert gas purged chamber used for seal welding tubes to tube sheets.



PROCESSING EQUIPMENT

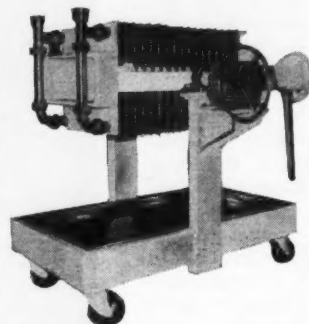
**Pressure drop dips to zero
but tilting filter press
still holds cake**

Horizontal for filtering —
vertical tilt for cleaning

Uses: Filtering various materials in chemical, food, and allied industries.

Features: Filter cake will not drop off plates during operation, even when pressure drop dips to zero. Filter is equipped with worm gear arrangement for rotating plates to vertical position for easy cleaning.

Description: Filter press operates with plates in horizontal position during normal filtration. Plates measure 18x18". They have stainless steel



Worm gear arrangement on filter press permits plates to be turned from horizontal to vertical position for easy cleaning

filter-media supports and screen-backing plates. Filtering area ranges from 15 to 100 sq ft, with 2 to 35 plates. Space can be specified for 1½, 2, or 3"-thick cake.

Press is equipped with heavy-duty ratchet sealing attachment, removable drip tray, and precision-ground surfaces to prevent leakage.

(Tilting filter press is product of Terriss Division, Consolidated Siphon Supply Co., Inc., 22 Wooster Street, New York 13, New York.)

Check 2381 opposite last page.

Vertical mill is treated in Bul 78 — Raymond Division, Combustion Engineering, Inc., 1116 W. Blackhawk St., Chicago 16, Ill.

Check 2382 opposite last page.

Check 2380 opposite last page



PROBLEMS?

Interested in solving them? Want to learn new ways of improving your plant operation and, thereby, realize savings?

In each...

issue of CHEMICAL PROCESSING there are articles that will help you solve many of your operational problems.

These "New Solution" stories appear in the "New Solutions" section which begins on page 65 of this issue.

This type of story is featured in other sections throughout the magazine.

They are case history stories that state the operating problem, explain how it was solved, and describe the results obtained.

"New Solution" stories cover all important phases of your operations — processing, safety, maintenance, material handling, packaging, corrosion, to name a few.

For more information on product at right, specify 2383 see information request blank opposite last page.



SCOPE in INDUSTRY
SPECIALIZATION from...

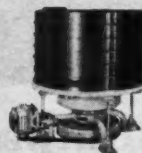
ALLIS-CHALMERS



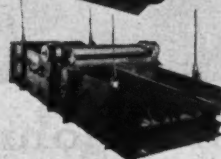
Compacting Mill



Roller-type
Granulating Mill



Gyratory Screen

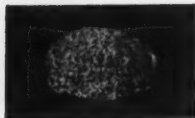
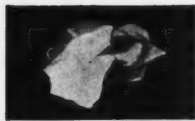


Vibrating Screen

Allis-Chalmers compacting process

Rescues "Lost" Profits

...converts waste chemical fines
into a salable product



A potash producer salvages seven tons per hour from sub-sized fines. A chemical salt manufacturer effects an 80% recovery of marketable material. Yes, waste becomes valuable when put through the Allis-Chalmers compacting process.

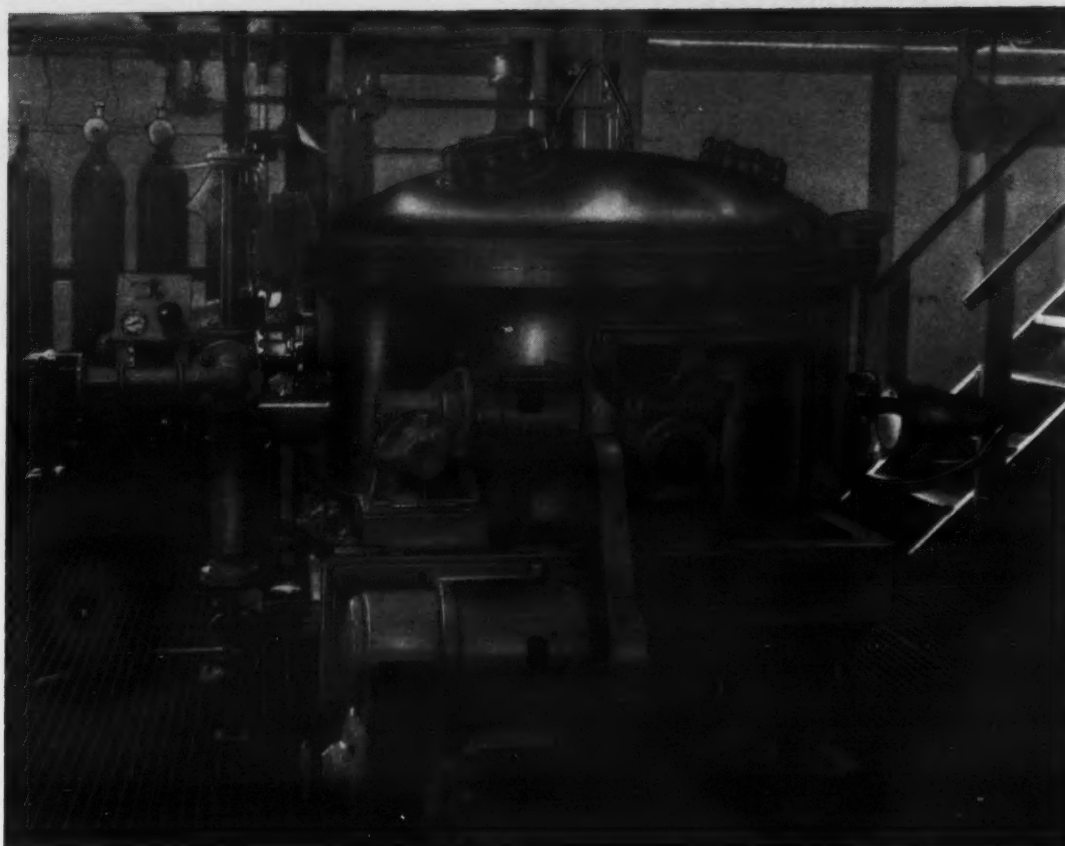
The compacting system is a package of integrated Allis-Chalmers equipment — the remarkable new compacting mill, a roller mill and either a gyratory or vibrating screen. The compacting mill mechanically densifies fines created in your original process. The resulting flakes or slabs are granulated in the roller mill and separated in the screen. Precise control of particle size, density and solubility factors is assured. Recovered product equals or surpasses parent product in every respect.

Get Bulletin 07B8836 from your A-C representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. In Canada, write Canadian Allis-Chalmers Ltd., Box 37, Montreal, Quebec.



A-5947





For The Upjohn Company... CUSTOM-BUILT solution for a filtration problem

This FEinc rotary pressure filter was designed and built recently to specifications of The Upjohn Company, Kalamazoo, Michigan. It separates organic crystals from a solvent slurry at pressures up to 30 p.s.i.

The design of this new rotary pressure scraper filter represents another achievement for Filtration Engineers in the design of filters for special applications.

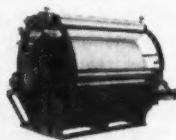
If you have a problem in solvent processing . . . or any other filtration problem . . . contact Filtration Engineers for specific recommendations which are available without obligation.

Your individual requirements determine the type of filter needed, its size, construction materials and the special features necessary for highest efficiency. For more complete data, see FEinc's section in Chemical Engineering Catalog or write Dept. CPF-659.

For a
Bigger Yield

FE INC®

FILTRATION ENGINEERS
AMERICAN MACHINE AND METALS, INC.
EAST MOLINE, ILLINOIS



STRING



HORIZONTAL



SCRAPER

SPECIALISTS IN LIQUID-SOLIDS SEPARATION

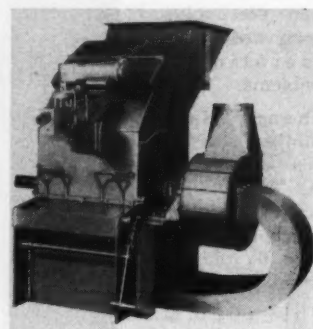
Check 2384 opposite last page

PROCESSING EQUIPMENT

Feed control system on mills assures better grinds at less power

Recently developed feed control system for manufacturer's line of heavy duty hammer mills results in more uniform grinding at less cost. Designed to be operated either manually or electrically from remote locations, system assures optimum feed flow, prevents slugging, and eliminates costly power surges.

Attached to a mill, the feed control is reported to do away with need for separate crusher-feeder. Flow is regulated



Feed control system on hammer mill assures optimum flow, eliminates costly power surges

so gently that feed hopper may even be filled before mill is started.

System is available on both direct- and belt-driven mills, covering 50 to 125 hp range. Added feature is that screen changes can be made almost instantly, while mills are operating, without raising top of mill.

(Further information about hammer mills with feed control system may be obtained from Schutte Pulverizer Co., Inc., 878 Bailey Avenue, Buffalo 6, New York.)

Check 2385 opposite last page.

Cone crushers are subject of eight-page bulletin. Included are schematic cross section of 30" crusher, advantages of controlled feed and even distribution, and average-capacity table. Bul 236A — Nordberg Mfg., Co., Milwaukee, Wis.

Check 2386 opposite last page.

THAT'S
INTERESTING

Strictly for the birds

Hitch-hiking is frowned upon in Europe. But when an early snow stranded birds on the German side of the Alps, international airlines organized an airlift to transport the shivering migrants to the South.

Big stretch in rubber

Consumption of new rubber this year in U. S. is expected to reach total of 1,550,000 long tons. The B. F. Goodrich Co. says this is about 200,000 long tons more than 1958.

Old stuff

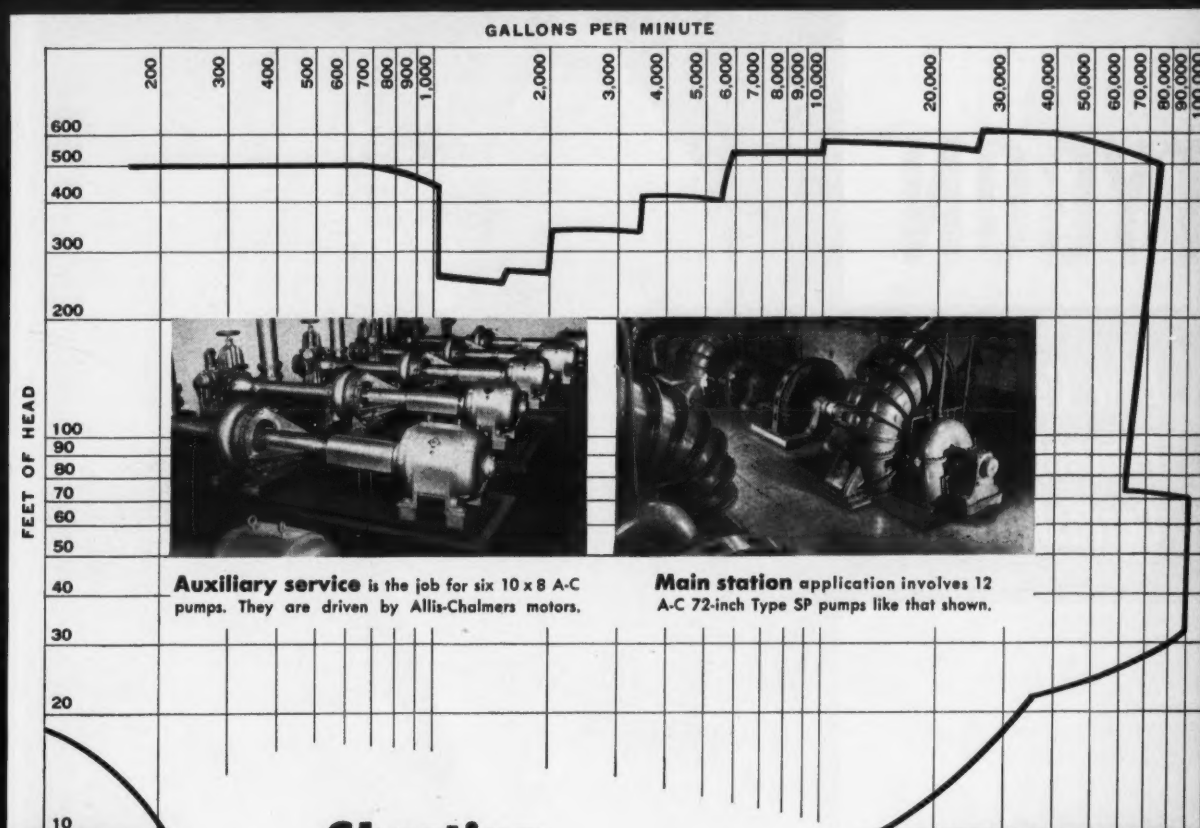
A can of corned beef—packed 135 years ago—was opened recently in a food laboratory in England. The Gentry Serenader reports the meat was "not too bad, though its edibility depends on a number of things, one of which is hunger."

For more information on product at right, specify 2387 see information request blank opposite last page.



SCOPE in INDUSTRY
SPECIALIZATION from...

ALLIS-CHALMERS



Charting

One Answer

for every pumping need

From the smallest auxiliaries to giant, main system pumps, the range chart for Allis-Chalmers pumping units covers practically every chemical industry requirement. This outstanding one-source equipment availability is a good reason why A-C should be given "first call" in modernizing your pumping facilities.

And complete line is only one "plus" for Allis-Chalmers. Teamed motors and control; customized standardization of parts and materials; engineering assistance and nationwide service are others.

Whatever your need in centrifugal pumps (and A-C builds units even beyond the chart shown), contact your representative or distributor. For additional information, write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.



A-1023-C

TYGON®

*Low Cost, Long-lasting
Protection Against
Corrosive Attack*



There's only one sensible way to measure cost when you buy paint to protect processing equipment, and that's *cost per year per square foot of protection*. A few pennies saved in cost per gallon can mean dollars lost if the paint fails on the tank.

That's why you'll find many chemical plants with low cost maintenance records use Tygon Coatings almost exclusively to provide maximum protection at minimum cost.

412-F



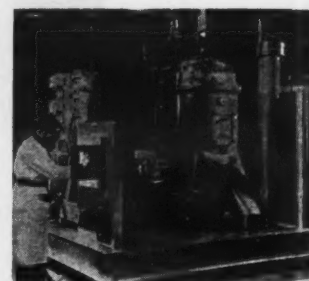
U. S. STONEWARE

AKRON 9, OHIO

NEW YORK • CHICAGO • HOUSTON • LOS ANGELES

Check 2388 opposite last page

PROCESSING EQUIPMENT



Ready to run . . .

. . . batches ranging from 3000 to 6000 gal per hr, this full-size continuous centrifuge has been mounted on a platform so that it can be shipped to customer's plants for production tests and pilot runs. Unit includes steel foundation, electric bowl hoist, receiving tank, pump, gages, and all other necessary auxiliaries. Only product and utilities need be furnished by processing plant.

(Further information about CNS-150/151 Titan Centrifuge may be obtained from the Pfaudler Company, 1086 West Avenue, Rochester, New York.) Check 2389 opp. last page.

**Crusher uses little power,
reduces solids entirely
by impact**

Can handle variety of products up to 10 tons per hr

Uses: Crushing wide variety of materials between 10 and 40-mesh size at rates up to 10 tons per hr.

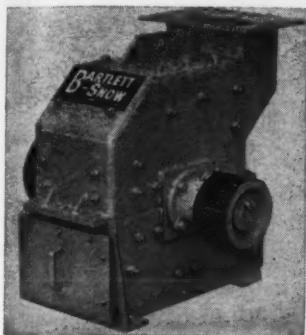
Features: Pulverizer crushes almost entirely by impact, resulting in low power consumption. One-piece hammers are manganese steel and extend full width of crusher.

Description: In operation, high-speed rotation of hammers pound incoming solids against series of hardened breaker blocks. Full weight of hammers is used. Hammer clearances are such that they prevent attrition of material, minimizing formation of fines. Material reduced to proper

PROCESSING EQUIPMENT

mesh is discharged through bottom screen. Oversized product is swept up by hammers and further reduced against breaker blocks.

Machines are available in three sizes ranging in capacity from one to 10 tons per hr.



Crusher has one-piece manganese steel hammers extending full width of unit

Power requirements vary from five to 20 hp. Housings are made of welded steel, combining ruggedness, lightweight, and economy.

(Swing-hammer pulverizers are product of the C. O. Bartlett & Snow Company, 6200 Harvard Avenue, Cleveland 5, Ohio.)

Check 2390 opposite last page.



"Guess what? Mr. DeKalb personally conducted me through his carbon black plant."



LEADERSHIP...

The white stallion leading his band to greener pastures symbolizes the attributes of leadership . . . alertness, strength, intelligence and initiative.

Mikro-Products has established its reputation for leadership through continuing development work and extensive experience in the fields of grinding, air conveying and dust collecting. The Mikro Plan was created specifically to meet the production demands of the processing industries.

The comprehensive Mikro Plan meets the requirements of customers all over the world. It includes: MIKRO

ENGINEERING, which creates equipment for new uses, and improves existing methods of processing; MIKRO LABORATORY ANALYSIS, available on call to devise more effective methods of processing the customers' materials; and world-wide MIKRO SERVICE, for on-the-spot solution of problems.

Genuine Mikro replacement parts are shipped within 48 hours of receipt of the order.

MIKRO PLAN facilities are at your disposal without obligation. Call on us at any time.

MIKRO-Products

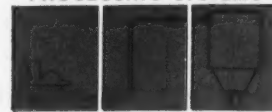
Pulverizing Machinery Division • Metals Disintegrating Company, Inc.
60 Chatham Road • Summit, New Jersey



REPRESENTATIVES throughout the United States, Continental Europe, British Isles, Canada, Mexico, Central and South America, West Indies, South Africa, India, Japan, Philippines, Australia and New Zealand.

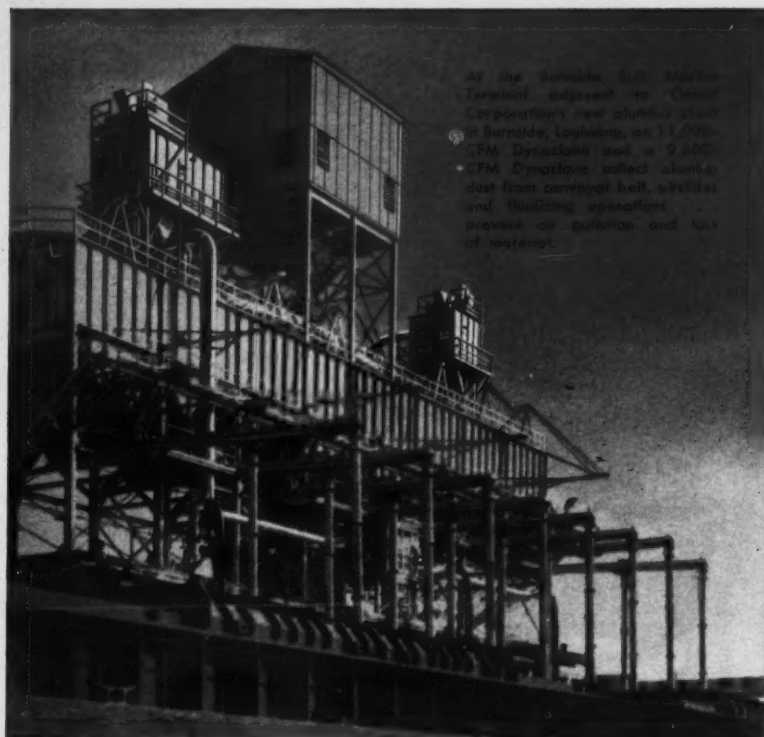
MANUFACTURING FACILITIES: United States, Canada, Continental Europe, British Isles.

PROCESSING SYSTEMS



GRINDING CONVEYING COLLECTING

Check 2391 opposite last page



At the Burnside Sulfur Market Terminal adjacent to Coker Corporation's new alumina plant in Burnside, Louisiana, an 11,000-CFM Dynaclone and a 2,000-CFM Dynaclone collect alumina dust from conveyor belt, chutes and flue-dust operations, prevent air pollution and loss of material.

Constant Suction! Complete Collection!

SLY DYNACLONE®

The Dust Filter for Continuous Processes

Just turn this dust filter on and forget it. The Dynaclone operates continuously, 24 hours a day. It maintains constant, uniform suction at dust sources, reclaims all the dust to prevent air pollution and damage to plant equipment.

The Dynaclone has new "Resist-O-Wear" filter bags (patent pending) that give as much as three times longer bag life . . .

It has a new roller cleaner for simplified automatic self-cleaning. Resilient rubber rolls form a positive dust seal as each row of bags is cleaned by atmospheric air drawn in by the main operating fan.

And it contains more cloth per cubic foot of filter than any other make . . . greater filtering capacity with smaller space requirements.

Learn the many reasons why the Dynaclone represents a new high in dust filter efficiency . . .

Send for 36-Page Catalog 104



THE W. W. SLY MANUFACTURING CO.

4754 TRAIN AVENUE • CLEVELAND 1, OHIO
OFFICES IN PRINCIPAL CITIES

OVERSEAS LICENSEE: ANDREW AIR CONDITIONING LTD., LONDON S.W. 1, ENGLAND

Check 2392 opposite last page



**PLANT ENGINEERING
MAINTENANCE & SAFETY**
... electrical & mechanical developments



No leaks, compact construction, and easier insulation are three big benefits obtained through use of welding fittings

At a large eastern chemical plant producing a polyester resin intermediate, welded stainless steel fittings assure . . .

A larger producer of dimethyl terephthalate obtained complete assurance that over 10 miles of stainless steel process piping would be leak-free. This was accomplished through the almost exclusive use of stainless steel welding fittings of all types and in all size from 1 to 12 inches.

Handling methanol vapor and liquid — a material known for its facility of leaking through screwed stainless fittings — dictated the choice.

As some of the processed material is very expensive, leaks would be very costly. Final product, DMT, is the basic chemical for "Terylene,"

a synthetic fiber manufactured by Canadian Industries Limited.

Basically, the process consists of reacting xylene with air and methanol to produce crude DMT, which is then purified by crystallization and distillation. Pressures range from 24" Hg to 30 ats.

Operation is continuous except for periodic shutdowns for inspection and maintenance of equipment. The whole plant is controlled from central control room.

Manufacturing area consists of a large four-story open-air building. Since the material being processed has a rela-



Welding fittings offer flexibility too. Company keeps a large supply on hand for making changes or additions to basic design

Not a leak in 10 miles of stainless steel piping

tively high freezing point, and most of the piping is exposed to weather, it is necessary to jacket and insulate throughout. If a leak should develop, it would not be an easy thing to locate and correct.

Choice of using welding fittings offered other advantages too. First is benefit of welded construction throughout piping system. Second is freedom and flexibility in designing layout — welded system is more compact and can be installed close to walls, ceilings, and floors.

Third, fittings' design gives good flow characteristics, since there are no pockets or

sharp corners to cause large pressure losses or product accumulation. Fourth, welded piping is easy to insulate.

Installation of welding fittings is simple. Fittings are butt welded right onto pipes cut to desired lengths. If a change in design is desired, fittings can be cut out of the line and used over again. Company keeps a supply of extra fittings on hand for adding to or changing basic process design.

(Flowline welding fittings are manufactured by Flowline Corp., New Castle, Pa.)

Check 2393 opposite last page.

NEW! STEARNS INDOX V Pulley

gives you
the lowest cost
magnetic protection

CHECK
THESE
ADVANTAGES

Costs nothing
to operate



Now — for the first time — you can buy a permanent magnet pulley that equals expensive electromagnet types in performance! Yet it will cost you less than for ordinary permanent pulleys!

If your process involves handling bulk materials on conveyor belts, Stearns Indox V pulley will remove small or large tramp iron particles continuously and automatically . . . at much lower initial cost—no operating cost.

Indox V — the amazing ceramic magnet material used exclusively in Stearns magnetic pulleys and separators — is the reason for this remarkable performance. Radial pole design produces a powerful magnetic field that blankets the entire conveyor burden, pulls out tramp iron far more efficiently than conventional pulleys.

Stearns Series "410" Permanent Magnet Pulleys — and Series "710" for deeper conveyor burdens — are available in standard widths from 12 to 48 inches, and in diameters of 12, 15, 18, 20 and 24 inches. Call your Stearns representative, or write for free literature. Ask for Bulletin No. 1021 B.

No chance of
power failures

No rectifier
needed

No maintenance
required

Impervious to
moisture

Radial design
boosts efficiency



STEARNS MAGNETIC PRODUCTS

A DIVISION OF THE INDIANA STEEL PRODUCTS COMPANY

635 SOUTH 28TH STREET

MILWAUKEE 46, WISCONSIN

Check 2394 opposite last page

Concrete bond impervious to water, alkalis

Uses: Joining fresh wet concrete to cured concrete.

Features: Agent forms membrane over entire bond area which is unaffected by water, alkalis, and mild acids.

Description: Concrete bond is composed of epoxy- and nylon-type synthetic resins. This forms permanent joint and water and vapor barrier without mechanical interlocking.

In addition to concrete-to-concrete applications, bond provides adhesion to brick, stone, cinder block, and gypsum block.

Mixing of two components starts curing cycle. Thin coating is applied to surface by roller, brush, or spray. In general, one gallon will cover up to 200 sq ft. Depending on temperature, pot life is from one to two hours.

Strength of surface layer is not dependent on thickness. This permits thinner layer which results in savings in such applications as resurfacing of heavy-duty plant floors and pouring fill on slab to provide flush surfaces.

(Uniweid structural welding agent is product of Permagile Corporation of America, Woodside, N.Y.)

Check 2395 opposite last page.

ASA preferred numbers utilized in single-stage centrifugal pumps

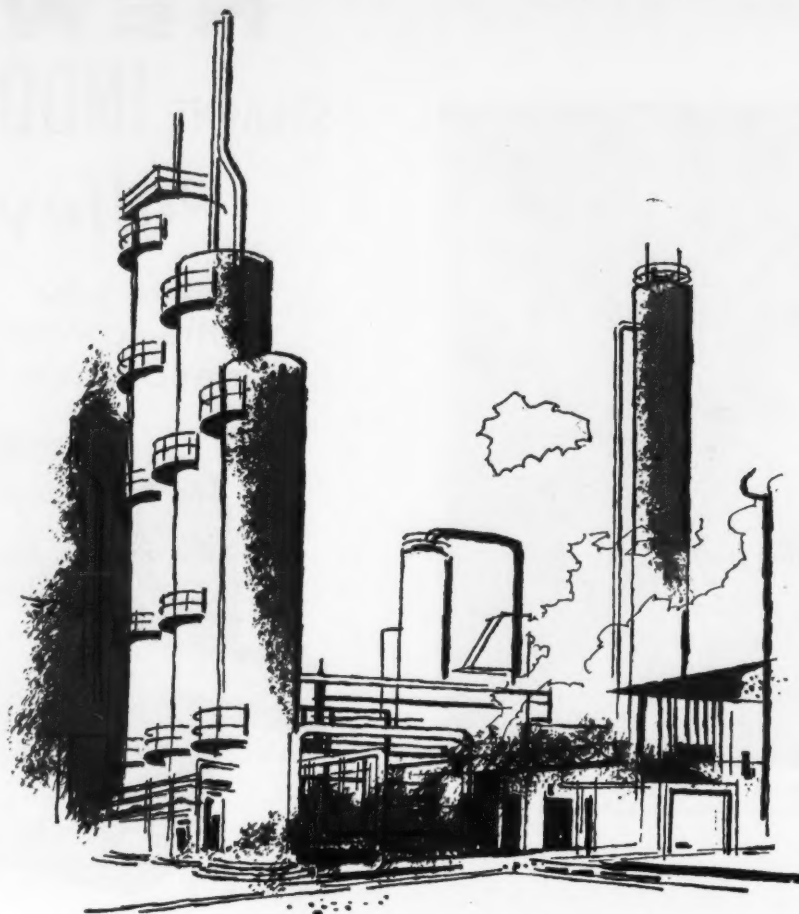
Casings rotated to adapt to horizontal discharge

Uses: In centrifugal-pump applications.

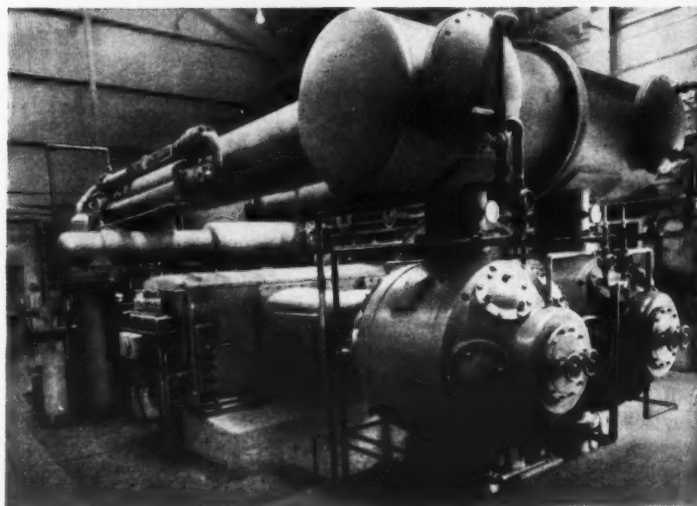
Features: Line of pumps is based on ASA-preferred-number system. By rotating casing around shaft center, pump discharge can be placed in any position.

Description: Complete line of single-stage centrifugal pumps will be comprised of 41 sizes with capacity range of 10 to 3000 gpm and heads of 10 to 250 ft.

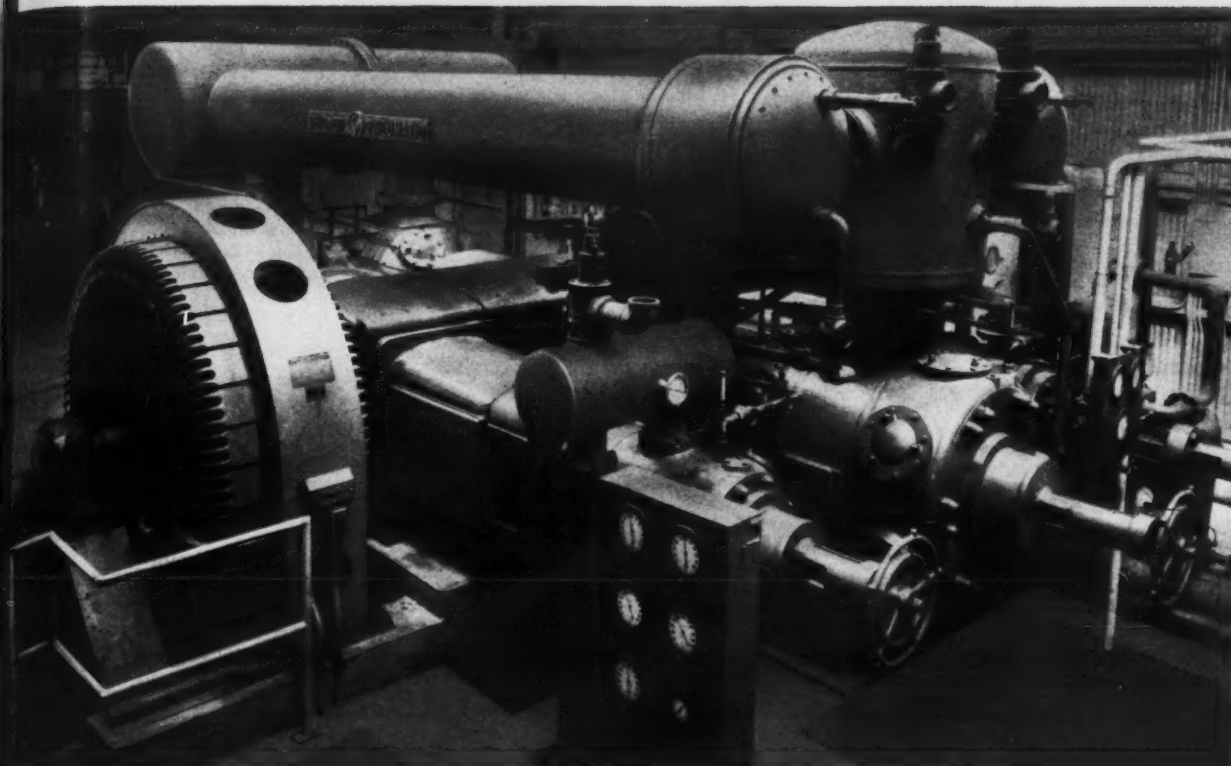
Casings have center-line discharge for automatic air



CLASS WORKHORSE



*Two views of a 2500hp,
five-throw, five-stage
Class FE Compressor
installed in a large steel plant*



FE COMPRESSORS FOR AIR LIQUEFACTION

Class FE horizontal, balanced-opposed compressors are doing an impressive job in the production of oxygen and in many other processes which demand compressors that take high pressures and heavy duty service in their stride. The "FE" is only one of many CP designs for such requirements. Horsepowers to 5000; pressures up to 15,000 pounds. Write for detailed specifications.



Chicago Pneumatic 8 East 44th Street, New York 17, N. Y.

AIR AND GAS COMPRESSORS • VACUUM PUMPS • PNEUMATIC TOOLS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS

Check 2396 opposite last page



Pump casings have center-line discharge for automatic air venting

venting. Pumps are available with cooling jacket which can be attached at time of shipment or later in field.

Open-type ball-bearing motors, powered by 208-220/440v, three-phase, 60-cy AC, are furnished. Standard working pressure is to 125 psi and standard temperatures are to 240°F (320°F with cooling jacket).

(Single-stage centrifugal pumps are product of Taco Heaters, Incorporated, 1160 Cranston St., Cranston 9, Rhode Island.)

Check 2397 opposite last page.

Bond is not harmful to polystyrene foam

Uses: For bonding rigid and semi-rigid expanded polystyrene foams to each other and to other materials such as wood, concrete, metals.

Features: Water-dispersed formulation eliminates danger of solvent attack on polystyrene-foam cells. Tools and equipment may be cleaned with water before adhesive dries.

Description: Bonds made with new adhesive resist humidity and freezing temperatures. They maintain strength throughout temperature range of -35 to +250°F. Bonds also resist short-time exposure to temperatures up to 350°F.

(Bondmaster G459 is product of Department P, Rubber & Asbestos Corp., Bloomfield, New Jersey.)

Check 2398 opposite last page.



STAINLESS TANKS
for formaldehyde storage at Western
chemical plant.

Puget Sound Fabricates *Chemical* from industry's "specs"

Located "on the spot" in the West, the personnel and facilities at Puget Sound are geared to offer intimate attention and undivided responsibility on any custom fabricating job involving steel plate and alloys up to 1" in thickness. Engineering staff and shop personnel are thoroughly experienced in working with clad metals, alloys and special protective linings for vessels, tanks and plant equipment designed to meet exacting chemical processing requirements.

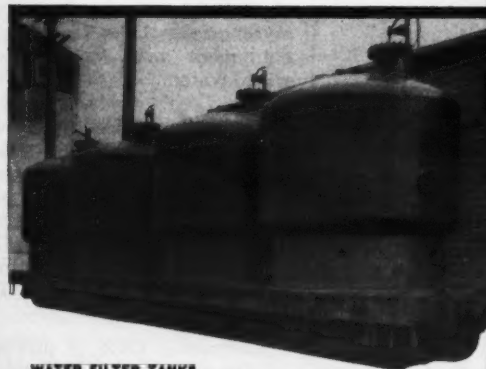
The opportunity to talk over projects of any size and complexity is welcomed. Fabricating recommendations and cost estimates are promptly supplied from your blueprint plans at no obligation.

REQUEST BROCHURE NO. M-59

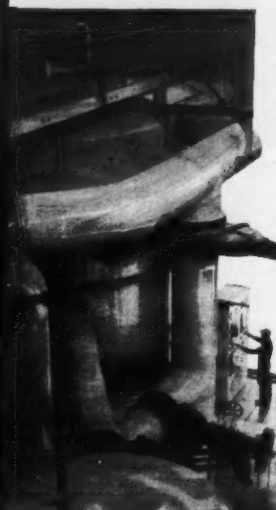


PS **PUGET SOUND**
F **FABRICATORS, INC.**
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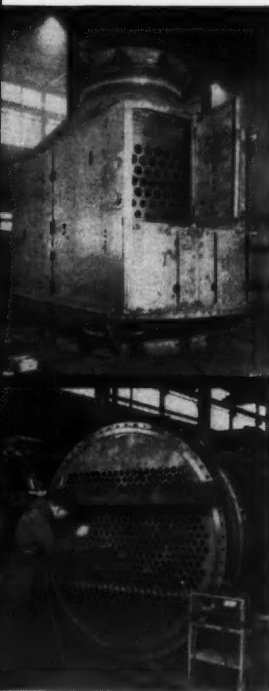


WATER FILTER TANKS
of carbon steel for Western petrochemical plant.



CAUSTIC STORAGE TANKS
fabricated of nickel-clad for large
chemical producer in Western Canada.

AIR PRE-HEATER
and casing of carbon steel for refinery
in the West.

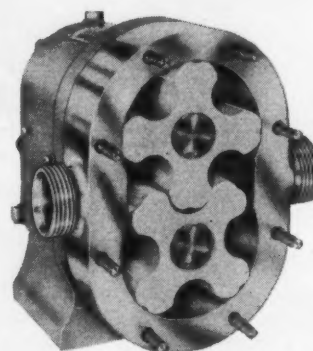


HEAT EXCHANGER
combining stainless and mild steel for
installation in Western electro-chemical
plant.

ENGINEERING & SAFETY

White rubber impellers in rotary pump

Rotary pump, incorporating white rubber impellers, is designed to handle products of high viscosity as well as fluids. Impellers are non-toxic and will not absorb or impart flavors.



White rubber impellers of rotary
pump are non-toxic

Pump cover and impellers have smooth flat sanitary surface for easy cleaning. Pump is for service up to 150 psi.

(White rubber impeller pump is product of Waukesha Foundry Co., Waukesha, Wis.)

Check 2400 opposite last page.

Interchangeable packings expand horizons of swivel joint

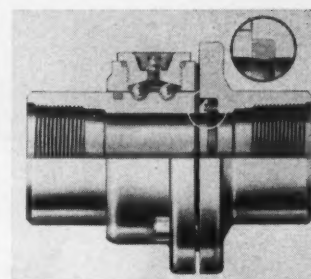
Packings are replaceable with joints in line

Uses: Chemical services in temperature range of -40 to +400°F and 300-psi internal pressure. Steam service rotation to 440°F at 360 psi.

Features: Joint has provision for interchanging packings to permit variable service. Packing seals may be replaced without removal of joint from line.

Description: Maximum temperature rating is 600°F at 200 psi for occasional swing or oscillating services. Cold working pressure is 1000 psi. Packing materials available are as follows:

- 1) Molded type—Neoprene, Hycar, butyl, Viton A
- 2) Disc type—Teflon, asbes-



Ball-bearing swivel joint has provision for interchangeable packings. Inset photo is alternate molded packing. White circled packing arrangement is disc seal with springs and pressure ring

tos, Kel-F, and metallic

Joint is available in sizes 3/8 through 4" in six of the eight basic swivel-joint configurations. Metal is 1040 steel.

(DS series swivel joints are product of Chiksan Company, Subsidiary of Food Machinery and Chemical Corp., Brea, Calif.)

Check 2401 opposite last page.

Refrigerant-blown foam has greatly increased insulation power

Space and material saved with rigid polyester foam

Recently developed liquid-foaming insulation utilizes polyester resins in combination with refrigerants as blowing agents. This system results in low-K-factor, rapid-cure, foam-in-place insulation.

Refrigerant-blown foams save space and material since approximately 1 1/4" thickness of it is equivalent to about 3" of conventional insulation of this type.

Additional advantages of insulation of refrigerant-blown foam are self-adhesion to variety of substances, back-panel elimination, and sound dampening.

(Further information on refrigerant-blown polyester-foam insulations may be obtained from Paint and Brush Division, Pittsburgh Plate Glass Company, 1 Gateway Center, Pittsburgh 22, Pa.)

Check 2402 opposite last page.

Check 2399 opposite last page

THAT'S INTERESTING

Oxide scale remover

A new development reported by *American Metal Market* concerns a process to remove tough oxide scale from titanium metal parts. Process removes scale by electrolysis in a chemical bath.

Thyroid studies

Radioactive iodine (iodine 131) is being injected into thyroid glands of chickens in experiments aimed at finding a way to more efficient production of eggs and meat at the University of Massachusetts.

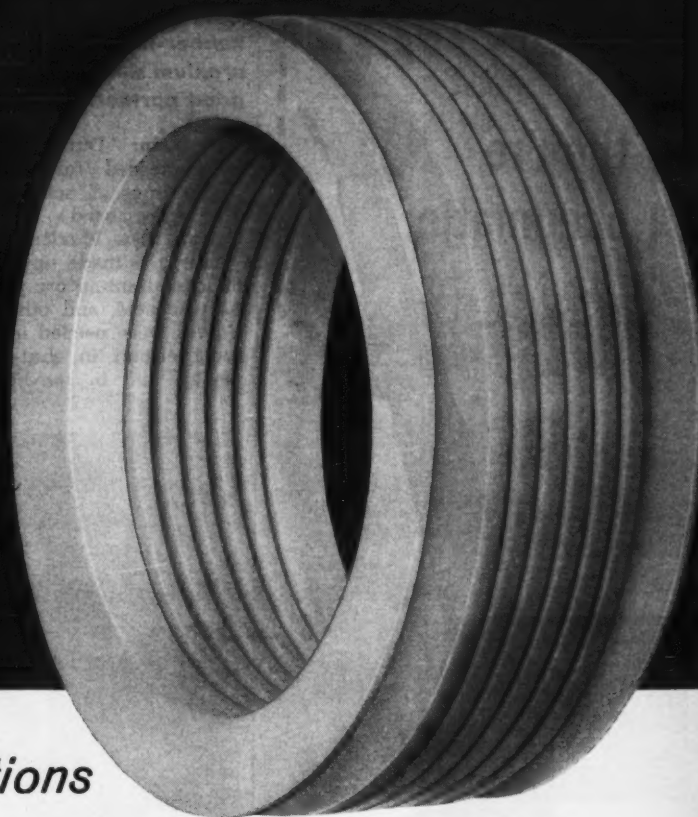
Pallet uniformity

European nations have done something about multiplicity of sizes in pallets, says the *German American Trade News*. A standard size, 31½ x 47" has been adopted for pallets used with fork lift trucks as well as for shipping and storing.

For more information on product at right, specify 2403 see information request blank opposite last page.



MORE OF THE GARLOCK 2,000



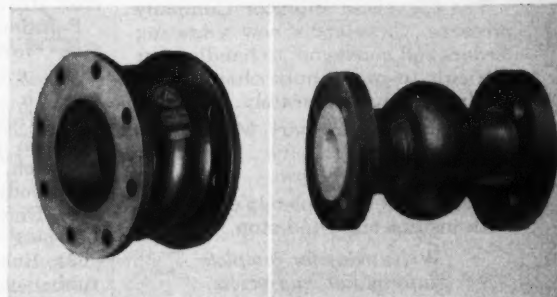
Under corrosive conditions

Protect expensive piping from shock, vibration damage

Garlock All-Teflon* Expansion Joints act as a cushion to absorb pump, compressor, engine and pressure surges . . . prevent stress, compensate for misalignment, reduce flange breakage . . . for service to 75 P.S.I. against solvents, acids, caustics. **Teflon-Lined Expansion Joints** are recommended where pressures rise as high as 125 P.S.I.

Garlock All-Rubber Expansion Joints offer the same fine performance against water, mild acids and caustics, or exhaust steam at temperatures to 180°F, pressures to 125 P.S.I., depending on the size of the joint.

Expansion joints are another important part of "the Garlock 2,000" . . . two thousand different styles of packings, gaskets, and seals for every need. The only complete line. Ask your Garlock representative for his recommendations, or write for Expansion Joint Catalog AD-137.



Garlock All-Rubber Expansion Joint (left) and Teflon-Lined Rubber Expansion Joint (right).

*DuPont Trademark for T.F.E.-fluorocarbon resin

THE GARLOCK PACKING COMPANY, Palmyra, N.Y.

For Prompt Service, contact one of our 30 sales offices and warehouses throughout the U.S. and Canada.

GARLOCK

Packings, Gaskets, Oil Seals, Mechanical Seals,
Molded and Extruded Rubber, Plastic Products



Canadian Division: The Garlock Packing Co. of Canada Ltd.

Plastics Division: United States Gasket Co.

they're **NEW**

they're
pneumatic



The Cleveland Vibrator Company presents: Cleveland's new vibrating feeders and conveyors to handle your difficult-to-move bulk chemicals—safely—surely—accurately.

Only one moving part. Mounting is easy, no springs to tune . . . and the cost is surprisingly low.

Variable flow completely controlled, with instant start and stop.

Write today for complete information and prices.



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Cleveland 13, Ohio

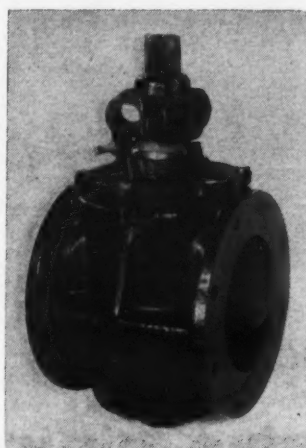
Check 2404 opposite last page

ENGINEERING & SAFETY

Rubber-lined valves and uranium slurry lines — good partnership

Problem: Durable valves were needed for uranium-slurry lines at acid plant of The Anaconda Company, Grants, New Mexico.

Slurry is made up of finely divided uranium ore particles, sulfuric acid, and other salts. Valves were needed in classifying circuit in shut-off capacity, and in ion-high ex-



Valves have varying degrees of soft-rubber lining

change circuit handling pulp composed largely of 20-micron size particles.

Solution: Several hundred plug valves were installed. Plug pivots eccentrically to match eccentrically raised seat. This eliminates friction between plug and body. Lubrication is not needed. Plug-body combinations used:

- 1) Duramet body and rubber plug
- 2) Rubber-lined body and rubber-covered plug
- 3) Rubber-lined body and metal plug

Results: Valves have been in operation since mill went on stream in December 1955. Initial difficulty with bottom bearing of plug was corrected.

Abrasion has been held to minimum and maintenance has been reasonable.

(Eccentric valves are product of The DeZurik Corporation, Sartell, Minnesota.)

Check 2405 opposite last page.

HAWS DRENCH SHOWERS

RID THE BODY OF CAUSTICS and CHEMICALS Instantly! Thoroughly!

ACCIDENTS with caustic chemicals strike with shocking swiftness—and Haws Drench Showers are instantly ready to deliver relief just as fast! A solid downpour washes away destructive materials—saving seconds until medical aid arrives, possibly averting serious injury and excessive compensation claims. Haws Drench Showers can help you! Write for details and illustrated literature.

MODEL 8935—Drench shower augmented by Haws eye-wash fountain. A complete safety station—always ready!



HAWS

DRINKING FAUCET CO.

(Since 1909)

1443 FOURTH STREET • BERKELEY 10, CALIFORNIA

Check 2406 opposite last page

GRIND BETTER BY

IMPACT

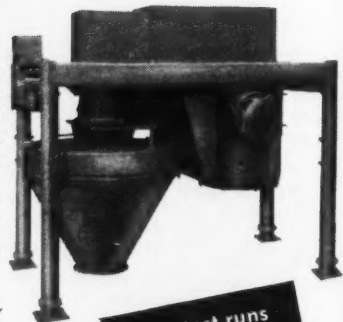


For closely controlled particle size reduction, minimum temperature rise, high abrasion resistance and low horsepower requirements with no grinding tolerances to maintain.

RECENT APPLICATION

Grinding raw glass scrap to 95% minus 16 mesh. Entoleter® Impact Mill with wear resistant impactors for economical tonnage processing of this extremely abrasive material.

- Vibrating Screens
 - Centrifugal Impact Mills and Mixers
- Send for complete literature.



Free test runs on your material.



ENTOLETER

DIVISION OF SAFETY INDUSTRIES, INC.

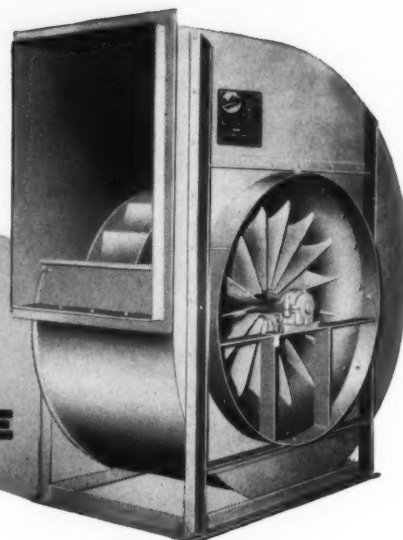
P.O. Box 904, New Haven, Conn.

Check 2407 opposite last page

CHEMICAL PROCESSING



"Buffalo" Type
"BLH" Fan



"Buffalo" Type
"BL" Fan

INSTALL PERFORMANCE NOT PROMISES

Promised catalog ratings and actual on the job ratings are not always the same. When you install "Buffalo" Fans you can always be sure that fan *performance* will confirm your good judgment. Buffalo Forge Company's 81 year reputation for highest engineering and manufacturing standards is assurance that you will obtain fan performance to meet the *exact* requirements of each job.

FOR HIGH PRESSURE REQUIREMENTS:

Designed especially for Class III and IV construction, the "Buffalo" Type "BLH" fan will provide peak performance for your high pressure systems. It affords a mechanical efficiency of 86% over a wide range, while maintaining stability of performance from free delivery to shutoff. The "BLH" features a smooth inlet bell, directional inlet vanes, backward-curved blades and divergent outlet. These factors reduce turbulence to a minimum, and give very

quiet operation. An added feature is the non-overloading characteristic. Bulletin F-201 gives complete details.

FOR MODERATE PRESSURE REQUIREMENTS:

The "Buffalo" Type "BL" Fan is an ideal choice for your Class I and II ventilating and air conditioning installations. Its high static efficiency over a broad range has been proved in hundreds of applications. The "BL" has many of the unique "Buffalo" features of the "BLH": it is non-overloading, and is designed for minimum turbulence and ultra-quiet operation. Other features are the factory-balanced wheel to minimize vibration and the wheel-contoured housing with large, correctly-shaped scroll. Write for Bulletin F-104.

Only "Buffalo" offers you the "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.



BUFFALO FORGE COMPANY

Buffalo, N. Y.

Buffalo Pumps Division • Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

VENTILATING • AIR CLEANING • AIR TEMPERING • INDUCED DRAFT • EXHAUSTING
FORCED DRAFT • COOLING • HEATING • PRESSURE BLOWING

Check 2408 opposite last page

CHEMICAL PROCESSING

170A



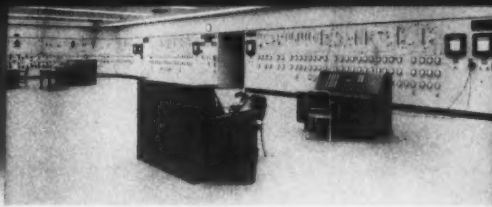
NO COMPROMISE WITH QUALITY IN THIS MODERN PETROLEUM PLANT

The capacity of this new Texaco Refinery at Anacortes, Washington, is 45,000 barrels of crude oil per day, processed into a full range of finished Texaco quality products . . . high octane and regular gasoline, jet fuel, burner oil, kerosene, diesel oil, bunker fuel and propane gas.

Quality control is the watchword here . . . with automation and instrumentation bearing the major responsibility. More than 30,000 Swagelok Tube Fittings were used for instrumentation

and steam tracer lines throughout the plant, including over 12,000 for the panel boards in the control center. In keeping with their high standards of quality in panelboard manufacturing, Swanson Engineering & Manufacturing Co. selected Swagelok Tube Fittings to secure precision control with torque-free seals that are absolutely tight. In the science of sealing, Swagelok Tube Fittings approach the ultimate desired by designers today.

CREDITS: Owner: Texas Company. Complete engineering procurement and construction: Bechtel Corporation, San Francisco, Calif.
Panel Boards for Central Control Room manufactured by Swanson Engineering & Manufacturing Co., Inglewood, Calif.



From four consoles in the central control room, operators can maintain constant check on temperatures at hundreds of points throughout the process units.



This view of back of panel board illustrates the outstanding craftsmanship in design and construction by SWANSON ENGINEERING & MANUFACTURING CO.

In this great new Texaco Refinery Swagelok Tube Fittings stand guard against pressure, vibration and torque

In the refining of 45,000 barrels of crude per day at the new Texaco Refinery, obviously all of the units in the process control line must bear a big load of trust in performance.

The Swagelok Tube Fittings used in the plant and control panels represent 30,000 trusts in dependable performance. Their design is unique, based on the principle that

nothing is quite so good as the finest that man's

ingenuity can create and that precision machines can produce!

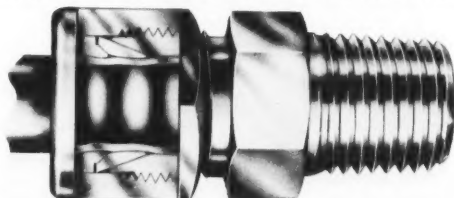
The new Texaco Refinery at Anacortes, Washington, is one of many different industries using Swagelok Tube Fittings for trouble-free, leak-proof operation.

Crawford Fitting Company

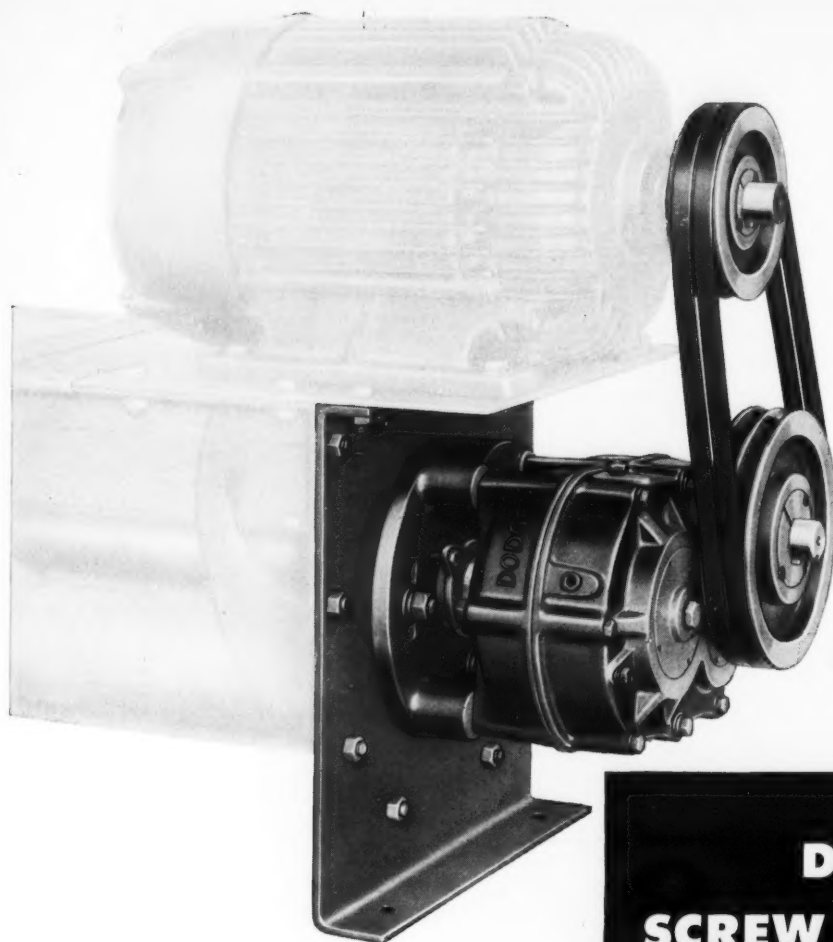
884 East 140th St., Cleveland 10, Ohio

Crawford Fittings (Canada) Ltd., Niagara Falls, Ontario, Canada

Swagelok®



Swagelok Tube Fittings are available in any machinable metal or plastic, in sizes for 1/16" through 1" O.D. tubing.



Entirely New!

Entirely Different!

DODGE SCREW CONVEYOR DRIVE

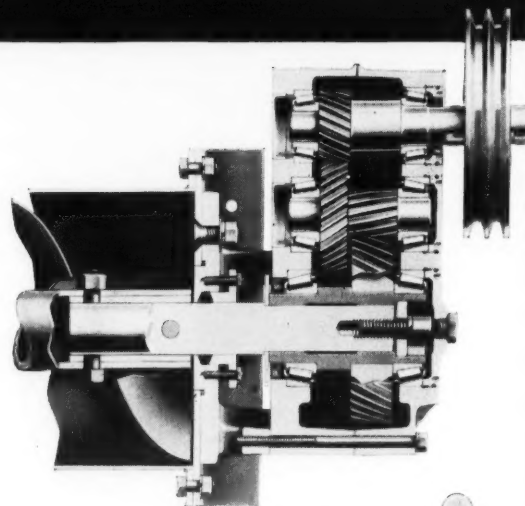
A complete package drive, including

- **Rugged, high-efficiency Reducer.**
- **Quick-removable Driving Shaft.**
- **External Packing Gland.**
- **Trough End (optional).**

Amazing new ease of installation—new ease of maintenance—new economy! No external thrust bearing or motor base is necessary. (However, a motor base of special design is available as optional equipment.) Pre-selected Taper-Lock V-Belt drives give required speeds. Built-in puller makes it easy to change driving shaft—without opening reducer. External packing gland protects reducer. Helical steel gears. Timken Bearing equipped throughout. Available from stock with 1½", 2", 2¾", 3" and 3¾" driving shafts. Ask your Dodge Distributor, or write us for bulletin giving complete technical data.

DODGE MANUFACTURING CORPORATION, 6200 Union, Mishawaka, Ind.

DODGE
→ of Mishawaka, Ind.



CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look in the white pages of your telephone directory for "Dodge Transmissioneer."



Check 2409 opposite last page

Tube-rolling torque control regulates expansion

Uses: Measures degree of tightness of rolled-tube joints. Ferrous and non-ferrous, seamless or welded, annealed tubes or tube ends may be control rolled.

Features: Unit controls amount of expansion on tubes of 1/4 to 4" OD.

Description: Tube-rolling torque control is housed in aluminum NEMA-12 enclosure. It is equipped with back support, permitting setting in standing position, and carrying handle. Major components are of plug-in variety.

Operating power is from standard 115v 60-cy AC. Control has dual-range ammeter — 0 to 10 and 0 to 20 amp. It also incorporates motor-monitoring mechanism and reverse time-delay cycle.

(Tube-rolling torque control is product of The Gustav Wiedeke Co., Dayton 1, Ohio.)

Check 2410 opposite last page.

Liquid H₂ and He stored without N₂ coolant

New concept of cryogenic insulation permits storage of liquid hydrogen and helium without use of nitrogen coolant. Insulations are lighter than other cryogenic types.

Insulations are presently being used in construction of large, unvented, liquid-helium vessel. Fifteen-day pressure rise for vessel will be 180 psi.

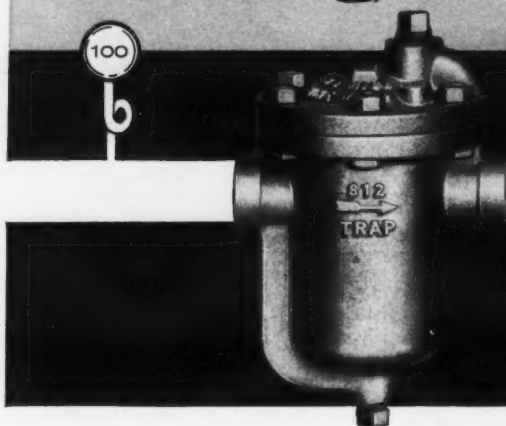
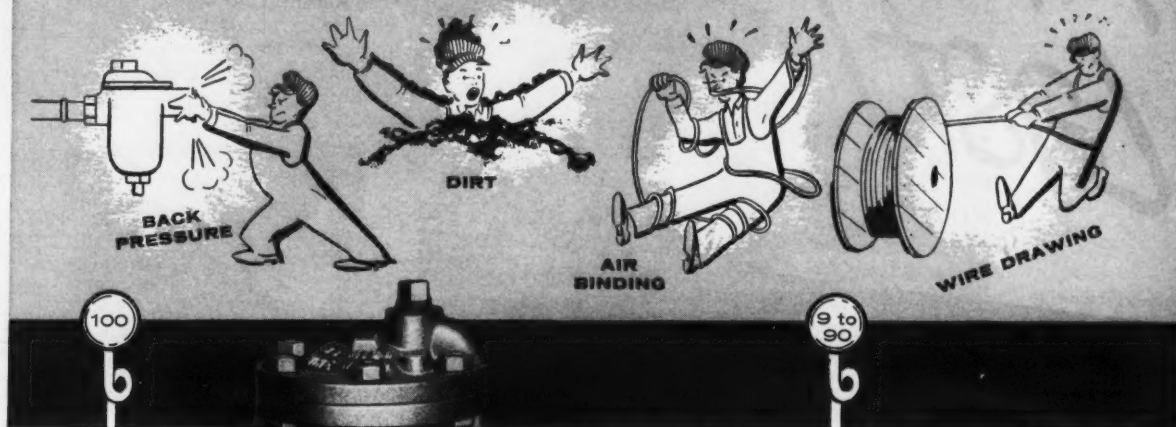
Reportedly, a 26,000-gal tank can be designed to have evaporation rate of less than 2.6%/year. Similar tank for liquid hydrogen is expected to lose 9%/year.

(Cryogenic insulation is development of Linde Company Division, Union Carbide Corporation, 30 E. 42nd St., New York 17, N.Y.)

Check 2411 opposite last page.

For more information on product on pages 170-B-170-C, specify 2412 . . . see information request blank opposite last page.

Have you ever been troubled by any of these steam trap problems?



ARMSTRONG STEAM TRAPS
are designed and made
to eliminate these problems

BACK PRESSURE . . . Armstrong Traps operate on any back pressure—or vacuum, for that matter. As long as there is a pressure differential across the trap, it will close on steam and open for condensate. Even the high back pressure caused by blow through of one or more traps in the system will not disturb Armstrong Traps. Other than a reduction in capacity, Armstrong Traps are unaffected by back pressure.

DIRT . . . Armstrong Traps are not affected by ordinary dirt. When the trap opens condensate swirls down under the edge of the bucket and up through the discharge orifice. Dirt is kept in suspension and discharged along with the condensate. For very bad dirt conditions, Armstrong offers traps with integral strainers. These cost less than a trap plus a separate strainer.

AIR BINDING . . . Armstrong Traps cannot air bind. Air in the system passes through a vent in the top of the bucket. It collects in the top of the trap and is discharged with the condensate. There is no chance for it to stop the trap. For low pressure on-and-off units where large amounts of air accumulate while the steam is off, Armstrong offers open float and thermostatic air vent traps in a complete range of sizes.

WIRE DRAWING . . . Armstrong Traps are designed and made to resist wire drawing. The valve and seat are tough stainless steel. The valve opens and closes tightly with a fast action and is always water sealed. There is virtually no chance for grit or sediment to lodge in the valve, virtually no chance to create conditions that lead to wire drawing.

There's no need to accept any of these problems as "inevitable." Your local Armstrong Representative can show you how to end them all. Call him today or write direct.



860 Series for low pressure heating service.



800 Series, side inlet, side outlet.



No. 801, side inlet, bottom outlet.



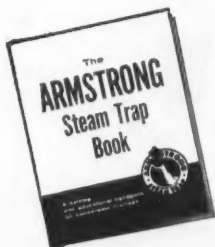
880 Series, integral strainer.



200 Series, bottom inlet, top outlet.



Forged Steel Series for high pressures, high temperatures.



The 48 page Armstrong Steam Trap Book tells how to correctly size, install and maintain steam traps for any pressure, any temperature, any load plus full catalog data on Armstrong Steam Traps. Ask for Catalog K.



ARMSTRONG MACHINE WORKS
8809 Maple Street Three Rivers, Michigan

Check 2413 opposite last page



LOW-COST, LONG-LASTING REPAIR OF CONCRETE SURFACES WITH

new Penntrowel

Resigning yourself to a costly replacement job on worn-out or corroded concrete or cement surfaces in your plant? Don't call a contractor—*repair* those damaged areas with new Penntrowel surfacing compounds!

PENNTROWEL is a new kind of resin surfacing material. It's tough, impermeable . . . resists acids, alkalis, solvents . . . bonds inseparably to repaired surfaces to give you long, trouble-free service.

PENNTROWEL is easy and economical to use. No expensive equipment needed—you just trowel it on. No shut-downs—Penntrowel cures overnight for next-day service. And its cost is amazingly low.

PENNTROWEL has been proved on the job in Pennsalt's own plants. Its three specialized grades give top performance in all kinds of corrosion or wear applications.



WRITE TODAY

for Penntrowel Bulletin CP-627
and installation cost data.

**Pennsalt
Chemicals**

ESTABLISHED 1890

Corrosion Engineering Products Dept. 695
PENNSALT CHEMICALS CORPORATION
Natrona, Pa.

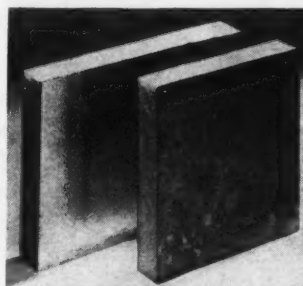
Penntrowel is a trade-mark of Pennsalt Chemicals Corp.

Check 2414 opposite last page

ENGINEERING & SAFETY

Fire-insulation board is self-extinguishing

Recently developed fire-insulation board has low heat-transfer rate and is self-extinguishing. Chemical added during polymerization renders



Chemical added during polymerization renders fire-insulation board flammably inert

board flammably inert. Insulation is made from expandable polystyrene beads which are welded together.

Fire-insulation board is manufactured in densities of 1 to 20 lb/cu ft. It is available in molded-slab, block, or sheet form in lengths up to 12', widths up to 4', and thicknesses to 8".

(Uni-Crest is product of United Cork Companies, 50 Central Ave., Kearny, N. J.)

Check 2415 opposite last page.



"You got a plugged column?"



G-B SNAP*ON DISTRIBUTORS

(See ad on facing page)

AKRON, Ohio, The Asbestos Supply Co.
ALBANY, Ga., Industry Insulation Co.
ALBUQUERQUE, Mt. States Insulation Co.
AMARILLO, McDonald Engineering & Insulating Co.
ATLANTA, Ga., Reynolds Aluminum Supply Co.
AUSTIN, Texas, Clinker Engineering Co.
BALTIMORE, Md., Leroy Insulation Co.
BILLINGS, Mont., Big Horn Supply, Inc.
BIRMINGHAM, Ala., Shook & Fletcher Supply Co.
Reynolds Aluminum Supply Co.
BOSTON, Homans-Kohler, Inc.
BUFFALO, Industrial Insulation Sales, Inc.
CHARLESTON, W. Va., Baldwin Asbestos Products Co.
CHARLESTON HEIGHTS, S. C., Stafford Insulation Co.
CHICAGO, E. C. Carlson Co.
Culberg Asbestos & Cork Co.
CHILLICOTHE, Ohio, Southern Ohio Insulating Co.
CLEVELAND, Ohio Asbestos and Insulation Co.
COLUMBIA, S. C., Industrial Insulation
Div. of Richland Oil Co.
COLUMBUS, Culberg of Ohio
Santeler Brothers
CORPUS CHRISTI, Precision Insulation Co.
DALLAS, Insulation Supply Co., Inc.
Payne-Ladewig, Inc.
DAVENPORT, Republic Electric Co.
DENVER, Gene Wright Lumber Co.
Powers Industrial Insulation, Inc.
DES MOINES, Iowa Asbestos Co., Inc.
EL PASO, Insulation Specialties Co.
EVANSVILLE, Ind., George Koch Sons, Inc.
FT. SMITH, Ark., Gunn Distributing Co.
FT. WAYNE, Ind., M. H. Hill, Inc.
FT. WORTH, The Bracken Co.
GREENSBORO, N. C., Starr Davis Co., Inc.
GULFPORT, Miss., Paine Supply Co.
HOUSTON, Precision Insulation Co.
INDIANAPOLIS, Central Supply Co.
JACKSON, Miss., Paine Refrigeration & Supply Co.
JACKSONVILLE, Ferber Sheet Metal Works
Reynolds Aluminum Supply Co.
JOPLIN, Mo., Joplin Cement Co.
KANSAS CITY, Central Supply Co.
LITTLE ROCK, Gunn Distributing Co.
LOS ANGELES, Thorpe Insulation Co.
Western Fibrous Glass Products Co.
LOUISVILLE, General Insulation & Roofing Co.
MACON, Ga., Industry Insulation Co.
MEMPHIS, John A. Denie's Sons Co.
MIAMI, Crabtree Insulation Co.
Reynolds Aluminum Supply Co.
Southern Metals Co.
MILWAUKEE, F. R. Dengel Co.
MINNEAPOLIS, Asbestos Products, Inc.
NASHVILLE, Reynolds Aluminum Supply Co.
NEWARK, N.J., Eastern Steam Specialty Co.
NEW ORLEANS, Eagle Asbestos & Packing
NEW YORK, Eastern Steam Specialty Co.
Hudson Valley Asbestos Corp.
OKLAHOMA CITY, Ball Distributing & Engineering Co.
OMAHA, Cardinal Supply & Mfg. Co.
ORANGE, Conn., Insulation Supply Co.
PADUCAH, Ky., Triangle Insulation Co.
PHILADELPHIA, John F. Scanlan, Inc.
PHOENIX, Ariz., Kircher Asbestos & Rubber Co.
PITTSBURGH, Dravo Corp.
PORTLAND, Ore., Western Fibrous Glass
RALEIGH, N.C., Reynolds Aluminum Supply Co.
RAPID CITY, S. D., Robbins & Stearns Wholesale
RICHMOND, Va., Reynolds Aluminum Supply Co.
ROANOKE, Va., C. E. Thurston Co.
ROCKFORD, Ill., Mott Brothers Co.
SALT LAKE CITY, Bullough Asbestos Supply Co.
SAN ANTONIO, The Bracken Co.
SAN DIEGO, Western Fibrous Glass Products
SAN FRANCISCO, Western Fibrous Glass Products
SAVANNAH, Ga., Reynolds Aluminum Supply Co.
SEATTLE, Western Fibrous Glass Products
ST. LOUIS, Hollander & Co., Inc.
The Stovey Company, Inc.
ST. PAUL, Asbestos Products, Inc.
SULLIVAN, Ill., Lewie David, Inc.
TALLAHASSEE, Fla., Bakers, Inc.
TAMPA, Fla., Eagle Roofing & Art Metal Works, Inc.
TULSA, Okla., Ball Distributing & Engr. Co.
TUPELO, Miss., Paine Supply Co.
VANCOUVER, B. C., Fleck Brothers Limited
WASHINGTON, D. C., Walter E. Campbell Co.
WICHITA, General Metals, Inc.



**They compared
"K" factors and
cost factors
... and bought
G-B SNAP*ON®**

FOR FREE TEVA SURVEY CALL YOUR LOCAL
G-B SNAP*ON DISTRIBUTOR
(LISTED IN ADJOINING COLUMN)

Here's how you can reduce the cost of insulating large pipe — simply use G-B Snap*On, the original one-piece pipe insulation molded of fine glass fibers. You can use G-B Snap*On in thinner wall thicknesses—and obtain the same, or superior insulating efficiency—for G-B Snap*On's thermal efficiency is unique among general-purpose pipe insulations. Application couldn't be easier or more economical—particularly when you use big 6' one-piece sections that snap on big pipe quicker than you can say "G-B Snap*On!"

Compare these and many other G-B Snap*On advantages by asking your G-B distributor to make a TEVA (Thermo-Economic Value Analysis) survey the next time you plan to insulate piping, be it hot or cold, large or small, indoors or out. G-B Snap*On is available in the complete range of sizes from copper tubing to 36" IPS ... plain, or with a variety of weather-proof and vapor barrier jackets.

GUSTIN-BACON *Manufacturing Co.* 

254 W. 10th St., Kansas City, Mo.

Thermal and acoustical glass fiber insulations . . . molded glass fiber pipe insulation
Couplings and fittings for plain and grooved end pipe

For more information on product at left, specify 2416 see information request blank opposite last page.



Pointers

for Mixing and Blending • Size Reduction • Pelleting and
Densifying • Size Classification • Bulk Materials Handling

Published in the interest of better processing by Sprout, Waldron & Co., Inc., Muncy, Pa.

POLYCARBONATE RESIN BLENDED IN STAINLESS STEEL MIXER

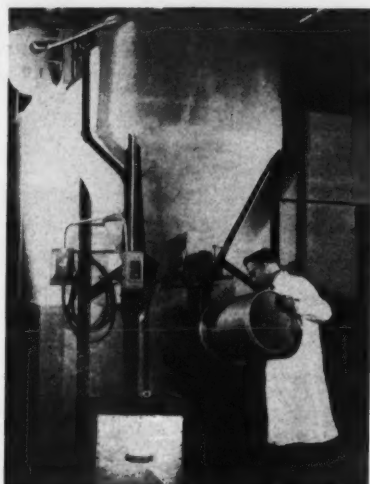
Uniform blending of polycarbonate resin at the General Electric Company's Chemical Development Department plant in Pittsfield, Mass., is being accomplished in a special stainless steel 50 cubic foot vertical mixer. The 10' 10" high, 60" diameter vertical mixer is jacketed for 14.7 psig steam pressure.

The product to be blended is trade named, "Lexan." It is a special polycarbonate resin molding compound developed by the General Electric Company to provide unusual toughness and heat stability. The mixer's job is to blend this resin while in $\frac{1}{8}$ " chopped rod pellet form just prior to packaging.

In designing the mixer, four major problems had to be overcome. The material had to be kept warm during processing; floor space was at a premium; excessive attrition had to be avoided; and it was desired to feed the mixer from the ground floor.

The use of a steam jacket on the mixer solved the problem of keeping the material warm during processing. The selection of the Sprout-Waldron vertical mixer design took care of the floor space requirements. This 50 cubic foot capacity mixer, including the table height loading unit requires less than 15 square feet of space.

Tests were conducted to find the optimum motor speed to assure



Stainless steel jacketed vertical mixer being fed through table high hopper at General Electric Company's Chemical Development Department in Pittsfield, Massachusetts.

thorough blending with a minimum of attrition . . . and ground floor feeding was achieved by the design of the mixer which receives its support from four vertical legs attached to the sides of the cylinder. The hopper is centered just about table top level for convenient feeding. The forced feed-in screw and elevating section below the mixing cone offers maximum efficiency.

For more information, write for Bulletin 192.

COP/103

PRACTICAL PNEUMATIC CONVEYOR DESIGN

A technical article by the Chief Engineer of our Materials Handling Division. It tells how to select, operate and maintain pneumatic systems for transporting dry, bulk materials. Positive, negative and combination systems are illustrated and described. Ask for Bulletin I-25.

Check 2417 opposite last page

ENGINEERING & SAFETY



Split jackets

. . . of heavy-duty type incorporate a "folded-and-formed" heating element. Jackets are utilized on pressure vessels, heating kettles, and similar equipment. They are custom-built.

Element is composed of nickel-chromium-alloy ribbons supported in refractory porcelain. It lines interior wall of jacket and is capable of operating temperatures up to 2000°F. Insulation may be Suprex, 85% magnesia, or calcium silicate.

(Heavy-duty split jackets are development of Trent, Inc., 211 Leverington Ave., Philadelphia 27, Pa.)

Check 2418 opp. last page.

Delivers 100-psig steam in 20 seconds

Uses: Vapor distillation and condensation, water heating and boosting, and hot-oil heat-transfer applications.

Features: Unit can deliver 100-psig steam in 20 seconds.

Description: Heater unit can deliver 300,000 Btu/hr. It incorporates centrifugal-type self-pumping action. Both shell and tube sides make pumps unnecessary against low heads.

Unit is gas or oil fired and has self-induced fuel-inlet and flue-outlet pressures. No stack is required. It is adaptable as heat exchanger or condenser by circulating ambient air.

(Heaters are product of Turbo-Heat, 1133 E. 35th St., Brooklyn 10, N. Y.)

Check 2419 opposite last page.

There's a
Monarch
nozzle for
every spray
job!



If the
liquid can be
sprayed with
direct-pressure
rely on
MONARCH
advanced-design
NOZZLES

Many industries make **MONARCH** Spray **NOZZLES** standard equipment. Monarch's advanced design reduces clogging and guarantees dependable applications to . . .

- ★ ACID CHAMBERS
- ★ AIR WASHING
- ★ CHEMICAL PROCESSING
- ★ COOLING PONDS
- ★ DESUPERHEATING
- ★ GAS SCRUBBING
- ★ HUMIDIFYING
- ★ OIL BURNERS
- ★ SPRAY DRYING

Send for Catalog I

Monarch

MFG. WORKS, INC.

3403 GAUL STREET
PHILADELPHIA 34, PA.

Check 2420 opposite last page

CHEMICAL PROCESSING

Use of vacuum cleaner to remove magnesium dust and shavings has resulted in 33% production-capacity increase and 25% clean-up-labor saving



A 30-second \$100,000 fire convinced Arlington, Texas Industries that safety precautions were inadequate; now . . .

Vacuum puts wet blanket on Mg-powder fire danger

Problem: A \$100,000 fire, running through entire building in 30 seconds, provided dramatic proof to Arlington, Texas Industries, Inc. that air vents, brushes, brooms, and shovels fell far short of maintaining adequate protection against ever-present danger of fire and/or explosion of magnesium dust and fine shavings.

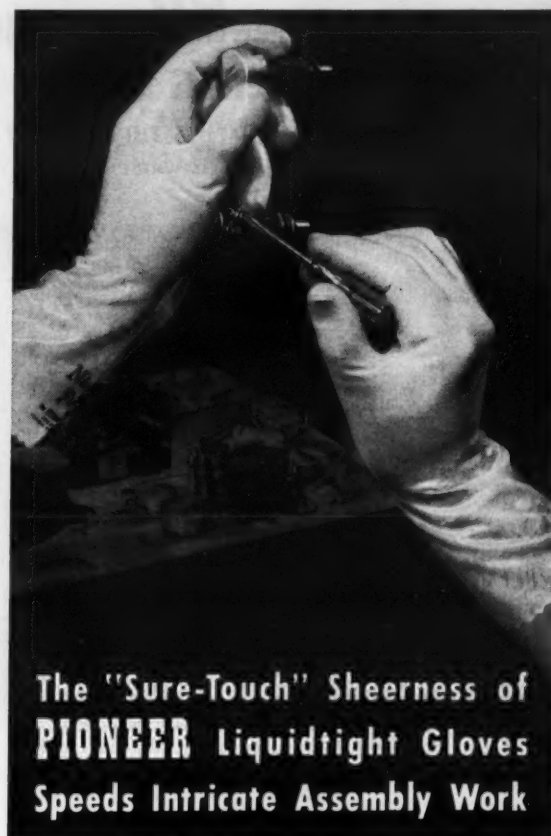
Second major fire occurred shortly thereafter in clean-up room, separated from main foundry. Despite protecting hoods over grinders, dust and shavings are accumulated in plant which produces magnesium castings. Greatest danger of chain-reaction fire from slight spark is

near machines which grind the castings.

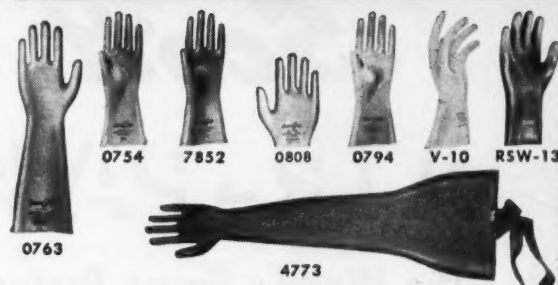
Constant guarding against explosions and fires was production handicap. Stopping and starting of machinery for various manual clean-up measures reduced output and required more men per job.

Solution: Mobile vacuum cleaner was utilized to prevent accumulation of magnesium dust and chips.

Particles are picked up by suction and travel through 75' rubber-covered hose into tank containing water. Dust separator with a 50-gal water capacity wets and traps material out of air stream. Air and entrained material pass between series of internal baffles located above and below



The "Sure-Touch" Sheerness of
PIONEER Liquidtight Gloves
Speeds Intricate Assembly Work



Style	Length	Material	Weight	Grip
Nimble Fingers V-10	10½"	Pylox Vinyl	Sheer	Non-Slip
Stanzoil RSW-13	10½"	Milled Neoprene	.018 (dbl)	Non-Slip
Sheergrip 0754	10½"	Natural Latex	.020 (dbl)	Smooth
Sheergrip 0794	10½"	Natural Latex	.025 (dbl)	Non-Slip
Sheergrip 0763	18"	Natural Latex	.023 (dbl)	Smooth
Sheergrip 4773	34"	Natural Latex	.035 (dbl)	Smooth
Sheergrip 7852	10½"	Neoprene Latex	.019 (dbl)	Smooth
Sheergrip 0808	7½"	Natural Latex	.020 (dbl)	Smooth

Mail This Coupon Today

The PIONEER Rubber Co.
241 Tiffin Road . . . Willard, Ohio

Sheer

Please send me:

☐ 1958-59 Pioneer Industrial Glove Catalog

☐ 17" x 22" Full Line Glove Wall Chart

☐ Job Description Form For Free Hand Protection Analysis

Firm.....

Address.....

City..... Zone..... State.....

Requested by.....

Check 2421 opposite last page

**WHEREVER BIG THINGS
ARE BEING DONE
IN MILITARY ESTABLISHMENTS THROUGHOUT THE WORLD
(AND ELSEWHERE)**



YOU WILL FIND
Scott
AIR-PAKS

**The World's Finest Protective
Breathing Equipment**



**SAFETY EQUIPMENT DIVISION
SCOTT AVIATION CORPORATION**
242 ERIE STREET, LANCASTER, N. Y.

Canada: Safety Supply Co., Toronto — Branches in Principal Cities
Export: Southern Oxygen Co., 230 West 57th Street, New York 19, N. Y.

MILITARY EMERGENCY ESCAPE SYSTEMS AND OXYGEN EQUIPMENT

Check 2422 opposite last page

ENGINEERING & SAFETY

water level in tank.

Non-soluble portion settles to bottom of tank in form of sludge. Periodic removal of sludge is made through discharge valve. Unit can be operated for 8 to 10 hours without water replenishment. Water-level inspections are made when cleaner is not in operation.

Vacuum cleaner has no internal moving parts. It develops suction of 6.5" Hg. Capacity is sufficient to operate two 1½" ID cleaning lines simultaneously.

Separator is equipped with 16" gravity-closing, combination explosion release and inspection door, 8" inspection door, 8" glass port-hole door, and two 2" gravity-closing explosion vents.

Motor, starting switch, and electrical connections comply with NEMA standards for use in explosive-dust areas. Cable is provided with grounding wire for positive grounding connection.

Dust separator, vacuum producer, and motor are assembled into unit mounted on roller bearings.

Results: Vacuum cleaner has virtually eliminated possibility of fire by preventing accumulation of magnesium dust and shavings. Since water concentration in unit always exceeds that of sludge, danger of ignition is greatly reduced.

Venting action precludes formation of potentially dangerous hydrogen-air mixtures. Use of water has kept unit operating costs low.

Clean-up-department labor costs have been reduced 25%. Capacity has been increased by 33%. Night shifts are no longer necessary to attain production goals.

(Wetco-Vac vacuum cleaner is product of U. S. Hoffman Machinery Corporation, 105 Fourth Ave., New York 13, New York.)

Check 2423 opposite last page.

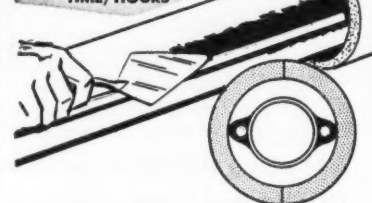
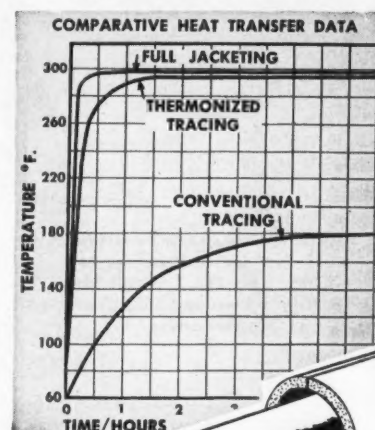
Resin surfacing compound, available in three grades for various corrosion and/or wear applications, is depicted in Bul CP-627 — Pennsalt Chemicals Corporation, Natrona, Pa.

Check 2424 opposite last page.

HAVE YOU TRIED



**Thoroughly proved
HEAT TRANSFER CEMENT
now effecting savings up to
90% for over 1,000 users!**



Theron is a non-metallic adhesive compound with highly efficient heat transfer properties, and is easily applied over either steam traced or electrical resistance systems . . . working equally well for either heating or cooling processes.

Theronizing has excellent heat transfer characteristics (see curves), exceeding steam traced equipment approximately 1100%, and closely approaching jacketing equipment. Theron can be used almost without exception in place of expensive jacketing (and in many applications where jacketing is impossible), with savings up to 90%.

Write for complete technical literature on revolutionary Theron!



1017 Rosine • P. O. Box 1961
Houston, Texas

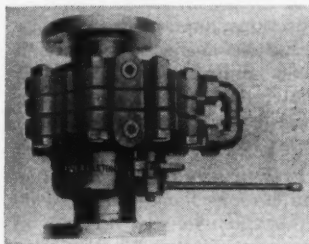
Check 2425 opposite last page
CHEMICAL PROCESSING

**Steam-jacketed valve
lets viscous materials
flow freely**

Uses: Maintenance of higher temperatures for materials which congeal and do not flow at ordinary or ambient temperatures. This includes such materials as tar, asphalt, pitch, paraffin, waxes, coal tar products, and adhesives.

Features: Valve jacketing is extended over neck to provide more complete jacketing surface. Jacket space surrounds port openings as well as body.

Description: Valve is offered in two models. One is furnished with iron body for 125-psig line pressure. It has



Jacketing is extended over neck to provide more complete surface

250-psig jacket pressure. Included is straight operating lever for pipe sizes 1½ to 4"; and 6" with compound lever.

Second model has cast-steel body for 150-psig pressure. It has 300-psig jacket pressure. Also included is 6" pipe. Double-disc design permits flow in either direction and either right- or left-compound operating lever for hand operation.

(Steam-jacketed valves are product of Everlasting Valve Co., Jersey City, N. J.)

Check 2426 opposite last page.

Isopropylamine safe-handling practices are considered in 16-page safety data sheet. Hazards surrounding use of chemical, and methods of control through preventive engineering, employee training, and use of protective equipment, are included in Chemical Safety Data Sheet SD-72, which is available at \$0.30 per copy from Manufacturing Chemists' Association, Inc., 1825 Connecticut Ave., N.W., Washington 9, D.C.

Now...at no increase in price 40% more HP...longer service life with Gates Vulco Ropes



Gates brings you, through *Specialized Research* in V-Belts, another important cost-saving advance:

Now—at no increase in price—the horsepower rating of Gates Vulco Ropes has been increased 40%.

As replacements on standard drives, these V-Belts with 40% more load carrying ability will give longer service. Longer life reduces down-time, and cuts belt replacement costs.

And as the tag tells you: Belts labeled "Gates Vulco Rope" or "Gates Hi-Power" are identical in construction and can be used interchangeably in matched sets.

Available Now from your nearby Gates Distributor

Today, all Vulco Ropes in Gates distributor and warehouse stocks have the new higher horsepower rating.

See the Yellow Pages of your phone book for your nearest Gates V-Belt distributor.

Designing NEW Drives?

For new drives, Gates now offers you the new *Super HC V-Belts and Sheaves*—the most advanced concept in power transmission in 25 years. The Super HC Drive is far more compact... takes up to 50% less space. Costs less, too. You save as much as 20% over present V-Belt drives. Ask your nearby Gates distributor for Handbook DH-900 entitled, "The Modern Way to Design V-Belt Drives."

The Gates Rubber Company Denver, Colorado
Gates Rubber of Canada Ltd., Brantford, Ontario

Gates VULCO ROPE Hi-Power V-Belts



Check 2427 opposite last page

Now...

**you can reduce
bulk materials
handling costs
with *Quickdraft*
high pressure exhausters**

FOR MOVING:

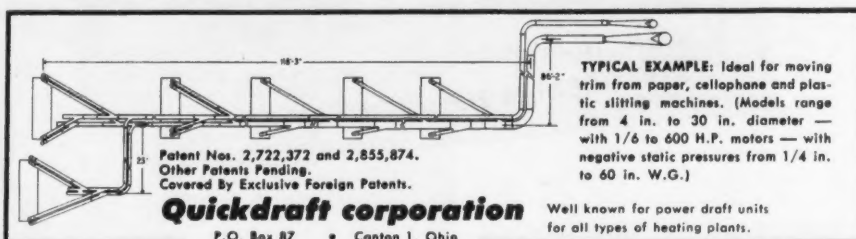
Cement, Sand, Iron Oxide, Wheat, Corn, Salt, Limestone, Castor Beans, Knots, Blocks, Paper, Wool, Cotton, Oats, Rags, Rubber, Vegetables, Coal (Powdered), Shavings, Cork, Sawdust... and any other materials that can be moved by air!

IMPORTANT NOTICE

For resisting abrasive action, Quickdraft units can be rubber lined. For withstanding corrosive gases, all Quickdraft units are available in standard acid resisting vitreous enamel, No. 316 Stainless Steel, rigid plastics (PVC), and with plastic and Fiberglass coatings.

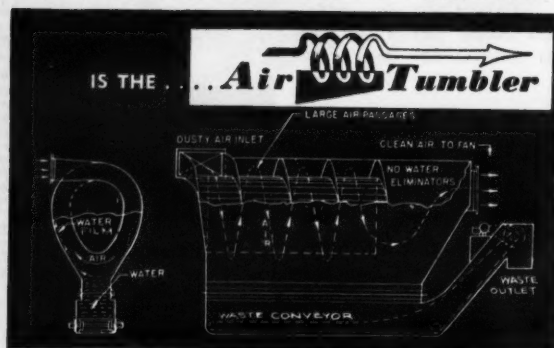
Time and maintenance savings usually pay for Quickdraft high-pressure exhausters in 6 to 18 months on materials handling jobs. Because material does not pass through blower, maintenance is negligible. Downtime for cleaning and replacing fans, motors and

bearings is eliminated. Quickdraft units are also ideal for exhausting paint spray, abrasives, corrosive gases, noxious fumes and high temperatures. For Quickdraft engineering data on materials handling, industrial exhausting, heating plant venting, write today!



Check 2428 opposite last page

The MASTER of DUST in INDUSTRY



**SIMPLE—DEPENDABLE—NO FIRE HAZARD
HIGH EFFICIENCY—CONSTANT CAPACITY
LOW HUMIDIFICATION—LOW
OPERATING COST**

More than one million CFM in ONE plant

Write for Bulletin No. 581. Address

**DUST SUPPRESSION
& ENGINEERING CO.**

P. O. BOX 67 • LAKE ORION, MICHIGAN

Check 2429 opposite last page

Surety saves you money

FOUR-2-ONE
VINYL IMPREGNATED WORK GLOVES



**SLIP ON
STYLE**



**KNIT WRIST
STYLE**

**PROVIDING
Longer Wear at
Lowest Cost**

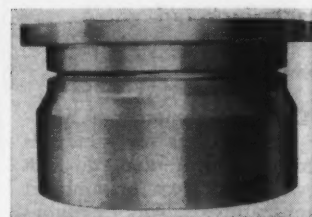
As the name indicates, count on these Surety gloves outwearing cotton and many leather types four or more to one in most work. Users report great resistance to snagging and abrasion plus easy finger flexing and hand comfort. You can wash them, too; come up sparkling bright and lint free. Available in men's and women's sizes, two styles illustrated. Want samples? Check your Surety distributor or write today.

THE
SURETY
RUBBER CO.
CARROLLTON, OHIO

In Canada: Safety Supply Co., Toronto

Check 2430 opposite last page

ENGINEERING & SAFETY



Pressure-vessel connection

... incorporates flange and seamless weld-end connection. Extension is first welded to vessel. ASA manway flange is welded to extension without refacing of flange. Joining weld can be X-rayed.

Flange incorporates full-ID opening for easier access to, and replacement of, vessel internals. Matching ID of weld-end extension eliminates constrictions imposed by pipe.

Extension has heavier wall than either pipe or rolled plate. Seamless construction eliminates an axial seam and need for radiography.

(Pressure-vessel connection combining flange and weld-end extension is product of Lenape Hydraulic Pressing and Forging Company, West Chester, Pa.)

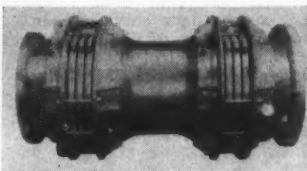
Check 2431 opposite last page.

**Absorbs lateral deflection
without pressure thrust**

Uses: Accommodation of pipe movement in any direction.

Features: Joints are said to absorb unlimited amount of lateral deflection without imposing pressure thrust on pipe or equipment. This eliminates need for heavy structural anchorage.

Description: Basic elements of bellows-type expansion joints include two hydraulically formed bellows, center section of pipe, and appropriate



Bellows-type expansion joints absorb pipe movement in any direction

ENGINEERING & SAFETY

ate tie rods. Non-equalizing, self-equalizing, or toroidal bellows are obtainable.

Standard sizes are from 3 to 72" in diameter. Units will accommodate pressures up to 2500 psi and temperatures from -320 to 1600°F. Special units are available for more severe conditions.

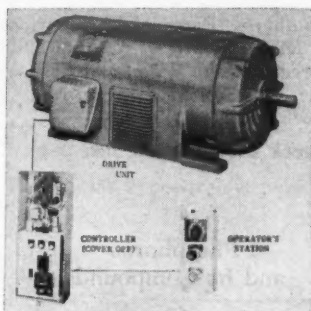
(Universal expansion joints are product of Zallea Brothers, 815 Locust St., Wilmington 99, Delaware.)

Check 2432 opposite last page.

Drive speeds adjustable — values maintained automatically

Uses: Delivery of precise operating speeds for machine tools, process machinery, test equipment, conveyors, and similar equipment.

Features: Tachometer feedback circuit continually moni-



Adjustable-speed-drive design eliminates brushes, commutators, and slip-rings, thus reducing maintenance

tors drive shaft and automatically corrects speed as required. Elimination of all brushes, commutators, and slip-rings reduces maintenance.

Description: AC motor drives a clutch drum at constant speed. Speed on clutch spider or output member is adjusted by varying DC excitation to clutch coil. DC is supplied by small controller. Finger-tip command of drive operations is from separate station.

Unit is suitable for continuous operation at constant-torque full load in ranges as

high as 34:1 and for intermittent use at any rpm value from 0 to full speed.

Drive is available in ratings of ¾ to 7½ hp. Inching control is standard.

(Adjusto-Spede® drive is product of Dept. P, The Louis Allis Co., 427 E. Stewart St., Milwaukee 1, Wis.)

Check 2433 opposite last page.

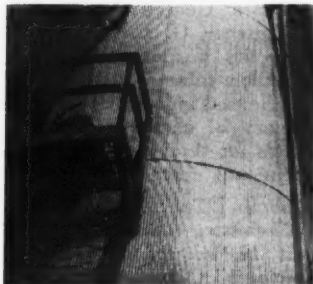
Aluminum-jacketing costs pared up to one-third by cross corrugation

Attached moisture barrier saves installation labor

Cross-corrugated aluminum jacketing was recently applied over 97,953 sq ft of towers and vessels at Phillips Petroleum's Sweeney, Texas, refinery.

Cross corrugation gives a 28% strength increase to deep-corrugated-jacketing sheet. This resulted in up to one-third cost saving. Factory-attached moisture barrier saved installation labor.

Calcium silicate and cellular-glass type insulation were



Factory-attached moisture barrier of corrugated aluminum jacketing reduces installation time

applied to fractionator towers and caustic washer vessels. Aluminum jacketing was secured over this installation.

Sheet used was 0.019" thick with 1¼" corrugation and rolled-in-3/16" cross corrugation.

(Corrugated aluminum jacketing is product of Childers Manufacturing Co., 3620 W. 11th St., Houston 8, Tex.)

Check 2434 opposite last page.



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- Vinyl-pigment dispersions
- Grease and petroleum production
- Suspensions
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There are many good reasons for using Gaulin Particle Control in blending, dispersing or emulsifying your products. First, it improves texture, makes finer more uniformly stable emulsions. Second, it accents color. Third, it stops separation.

Why not investigate Gaulin Homogenizers, Sub-Micron Dispersers or Colloid Mills for your products? Send for Technical Bulletins H-55, LH-55, SMD-55 and C-57. Ask for Gaulin GTA . . . Gaulin Technical Assistance, too. Or if you prefer to try Particle Control in your plant, rent a Gaulin Laboratory Homogenizer or Colloid Mill for only \$75.00 per month.



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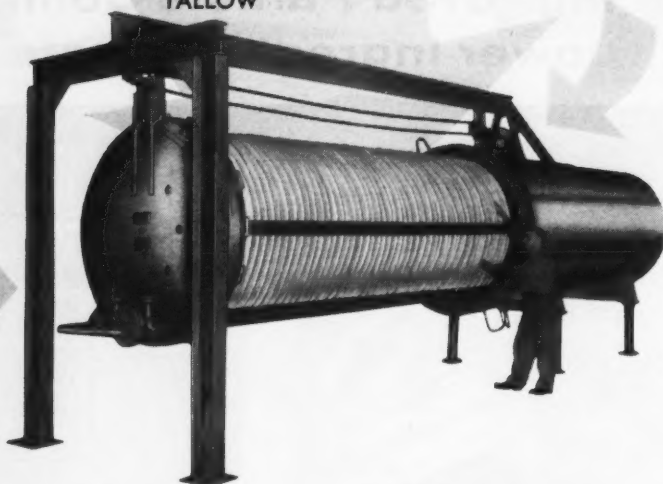
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Check 2436 opposite last page



recent books

reviews of current technical and reference work
... summarized for you by authorities in the
field with the CP staff

The Encyclopedia of Chemistry (Supplement)

This 332-page supplement to "The Encyclopedia of Chemistry" published in 1957 adds over 200 clear, concise articles. The arrangement of the supplement is identical to that of parent book. Articles appear alphabetically by subject, each written by a respected authority in science and/or industry.

Major attention is devoted to basic concept and developments. Strong emphasis is given to the impact on chemistry of nuclear phenomena. Although no coverage of foreign organizations is attempted because of space limitations, biographies of great chemists of the past and descriptions of nature and functions of American scientific organizations is included.

Authors George L. Clark and Gessner G. Hawley describe the purpose of these companion volumes as a highly condensed but authoritative summary of chemical fundamentals for those who are not professional chemists.

To obtain "The Encyclopedia of Chemistry (Supplement)" remit \$10.00 direct to Reinhold Publishing Corp., 430 Park Ave., New York 22, N.Y.

Physical Chemistry of High Polymers

Reviewed by
HILTON A. SMITH
University of Tennessee

This book of 175 pages is based on a series of lectures given by Dr. Maurice L. Huggins while he was a visiting professor in Japan. The author states that he has emphasized his own contributions; never-

theless, the 16 chapters embrace a wide range of subject matter.

The first four chapters cover topics related to nomenclature and syntheses. Next three deal with thermodynamics of polymer solutions. Chapters 8, 9, and 10 are concerned with physical properties of polymers.

Remaining six chapters are devoted to structure of polymeric substances. These chapters include not only modern synthetic polymers, but also naturally occurring substances.

Subject matter is well-organized and the book is clearly written. It is highly recommended, particularly to those who desire a quick introduction into this important field.

To obtain "Physical Chemistry of High Polymers," remit \$6.50 direct to John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, New York.

Check 2437 opposite last page.

Phosphorus and Its Compounds

Reviewed by
D. S. DAVIS
University of Alabama

Pointing out the need for a separate discipline for the chemistry of phosphorus compounds, Dr. John R. Van Wazer of the Monsanto Chemical Company lays a secure foundation in this 967-page Volume I. He has critically examined all the essentials of the growing literature of the field, has supplied his own interpretations of much of the reported experimental work, and deserves a high accolade for presenting valuable data in convenient useful forms.

The thirteen chapters deal competently with the phosphorus atom, interaction between atoms, systematic

chemistry of phosphorus, metal phosphides, hydrides, halides, pseudohalides, oxides, sulfides, nitrides, lower oxyacids, condensed phosphates, orthophosphoric acid, chain phosphates, ring phosphates, amorphous phosphates, and the amido acids of phosphorus.

Nine of the chapters lead off with historical aspects; others include good summaries and introductions. Organization of the textual matter is excellent throughout. The three appendices are concerned with phosphate minerals, single-bond energies, and thermodynamic data on compounds of phosphorus.

Vapor-pressure data in tabular and graphical forms supplement pressure-temperature equations and characterize the thorough treatment that pervades the book, which includes 83 tables and 185 figures. Thirty pages of author index and 34 of subject index are noteworthy, as is the very extensive documentation.

To obtain "Phosphorus and Its Compounds, Volume I: Chemistry," remit \$27.50 direct to Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y.

Check 2438 opposite last page.

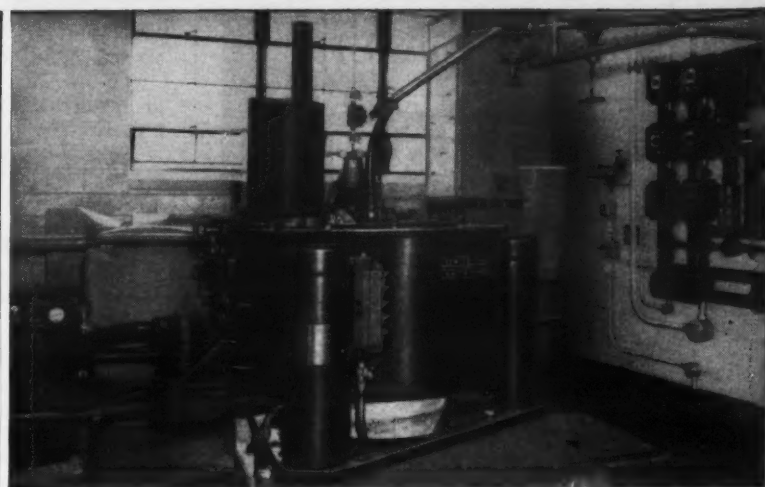
Vapor-Liquid Equilibrium

Reviewed by
DR. ANDREW SMITH
Athens College, Athens, Ala.

"Vapor-Liquid Equilibrium," by Edward Hala, Jiri Pick, Jottech Fried, and Otakar Vilim, Department of Physical Chemistry, Institute of Chemical Technology, Praha, Czechoslovakia, is translated by Dr. G. Standart. Book, containing 402 pages and 122 figures, is intended for those interested in separation of liquid mixtures into their components by distillation. Primary purpose is to show how to obtain and correlate experimental equilibrium data.

The first of three sections is concerned with theoretical principles and methods of calculation of equilibrium conditions from experimental data. A brief derivation of basic thermodynamic relations is presented. Most of the methods of calculation are illustrated by numerical examples (18 in all) which include problems met most frequently in practice.

Second part discusses measurement of temperature and pressure as well as pressure regulation. Attention has been



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For more complete data, see Tolhurst's Section in Chemical Engineering Catalog or write.

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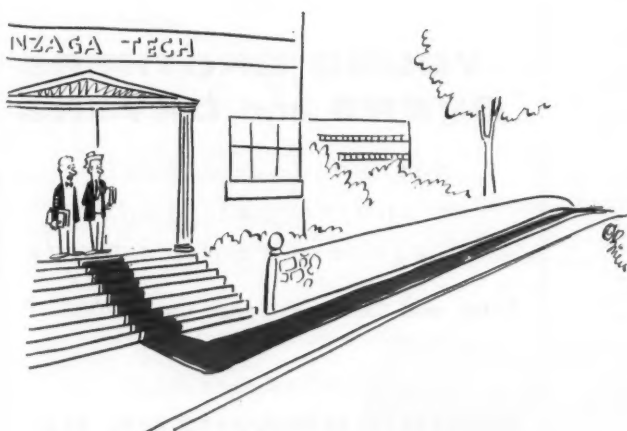
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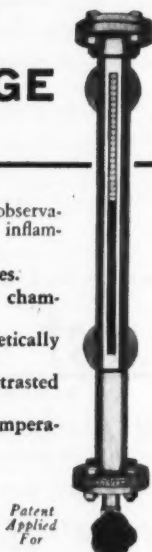
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Check 2441 opposite last page

RECENT BOOKS

given to the less-well-known, but practically useful, instruments and working procedures. Greater portion of this section reviews various types of ebulliometers for determination of boiling points, and equilibrium stills for determination of vapor-liquid equilibria.

Third section lists systems for which vapor-liquid equilibrium data have been published in the literature prior to February 1957. Both binary and multicomponent systems are listed. Literature references total 1232.

To obtain "Vapor-Liquid Equilibrium," remit \$14.00 direct to Pergamon Press, Inc., 122 East 57th Street, New York 22, N. Y.

Check 2442 opposite last page.

Fine Particle Measurement

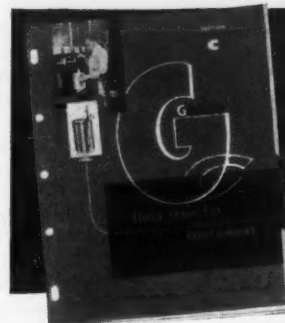
Reviewed by
RONALD H. LESTER
Ceramic Laboratory
General Electric Company

This excellent volume contains a detailed discussion of the most important techniques currently used in research laboratories for measurement of size, surface, and pore volume. Clyde Orr Jr. and J. M. Dallavalle have done an outstanding job in covering a field of tremendous importance and widespread application.

Introductory chapter describes significance of measurement techniques and their selection. Particle-size measurements are described in four chapters: Particle Size by Microscopy and Sieving, Sedimentation for Determination of Particle Size, Inertial Techniques for Size Analysis, and Particle Size for Radiation Scattering and Transmission. The descriptions are adequately treated in theory and provide the engineer or researcher with the necessary information for practical application.

There are also four chapters on surface-area measurement describing Permeanetry, Gas Adsorption, Liquid-phase

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CHEMICAL PROCESSING

RECENT BOOKS

Sorption and other Miscellaneous Methods. Final chapter is devoted to measurement of pore-size distribution.

The 353-page book is adequately illustrated and contains an extensive bibliography for those who wish to pursue the subjects in greater detail.

To obtain "Fine Particle Measurement," remit \$10.50 direct to The Macmillan Company, 60 Fifth Avenue, New York, New York.

Check 2445 opposite last page.

Advanced Analytical Chemistry

Reviewed by
E. L. GROVE
University of Alabama

"Advanced Analytical Chemistry," by Louis Meites and Henry C. Thomas, will do much toward meeting a need that has existed in the field commonly called instrumental analysis. The authors emphasize instrumental techniques and the theory that underlies the instrument, rather than operation of the instrument itself.

This 540-page text is limited to the fundamentals of a relatively few instrumental methods that have wide application in chemistry: potentiometry, conductometry, polarography, electrolysis, and spectrophotometry. Chapters on radiochemical and ion-exchange methods are included, and answers to 65 of the 187 problems are given.

The laboratory exercises, unusual since single simple systems such as chloride and cupric oxalate are examined by means of several different methods, permit comparison of instrumental techniques.

The book contains a chapter on absorption of infrared radiation by R. P. Bauman of the Polytechnical Institute of Brooklyn.

To obtain "Advanced Analytical Chemistry," remit \$8.90 direct to McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York 36, N. Y.

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For qualified engineering advice, or new technical literature, write to Department CP.

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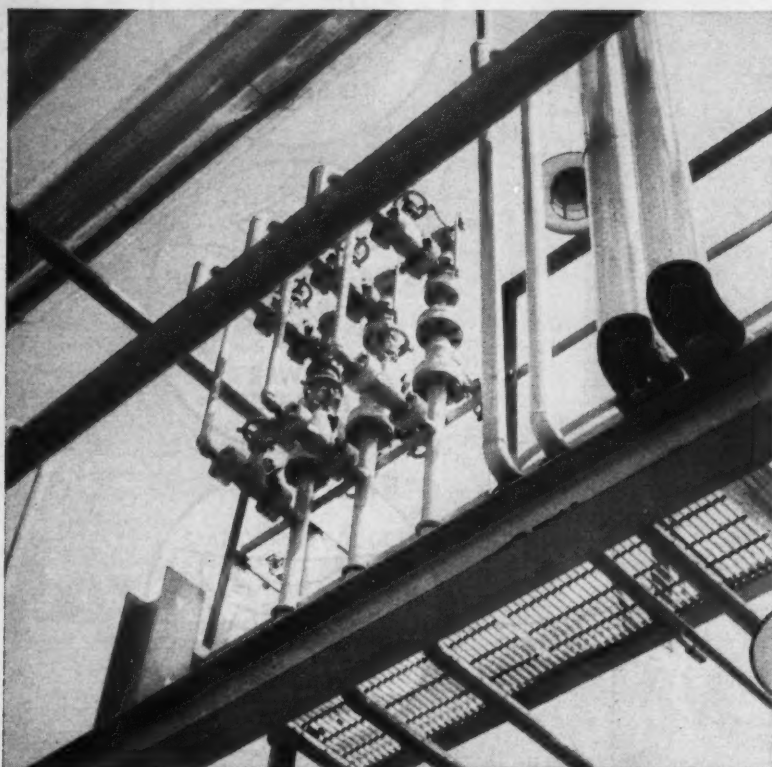


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SOURCE: Through your favorite industrial supply house.

LITERATURE: Write Department B for Catalog 58-B.

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Check 2447 opposite last page



new literature

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services. Additional reviews of catalogs, bulletins, data sheet, etc., are found throughout other sections of this magazine

Fire-fighting apparatus is listed in a catalog. Fire-fighting apparatus Cat — M. L. Snyder & Son, Inc., Jasper & York Streets, Philadelphia 25, Pa.

Check 2448 opposite last page.

Fork-lift trucks are subject of four-page bulletin. Bul KM-615—Kwik Mix Company, Division of Koehring Company, 235 W. Grand Ave., Port Washington, Wis.

Check 2449 opposite last page.

Nuclear systems' instruments and components are described in four-page brochure. Featured is section concerning isotope production. Bul 3015—Systems Division, Consolidated Electrodynamics Corporation, 300 North Sierra Madre Villa, Pasadena, Calif.

Check 2450 opposite last page.

Waste treating systems and their applications are covered in 8-page booklet. Description of efficient flotation-type separator is also included. Bul 4486—Industrial Waste Division, The Permutit Company, a division of Pfaunder Permutit Inc., 50 West 44th Street, New York 36, New York.

Check 2451 opposite last page.

Gas flow rate computing using company's instruments is explained in Application Data Sheets 783-30 through 783-33—The Foxboro Company, Foxboro, Mass.

Check 2452 opposite last page.

Triethylenediamine, a one-shot polyether catalyst for producing urethane foams, is discussed in 20-page Triethylenediamine Tech Data Bul — Houdry Process Corporation, 1528 Walnut St., Philadelphia 2, Pa.

Check 2453 opposite last page.

Mixers and accessory equipment are described in eight-page bulletin. Construction details and specifications are given for gearless single- and twin-motion mixers and for geared laboratory and production models in Bul 500-159 — The J. H. Day Company, Division of The Cleveland Automatic Machine Company, 4932 Beech St., Cincinnati 12, Ohio.

Check 2454 opposite last page.

Fatty nitrogen for fabric conditioners (dihydrogenated tallow dimethyl ammonium chloride) is considered in detail in eight-page Tech Bul 120 — Chemical Division, General Mills, Inc., South Kensington Road, Kankakee, Ill.

Check 2455 opposite last page.

Secondary oil recovery is subject of 11-page reprint of technical paper, "Role of Microorganisms in Secondary Oil Recovery", presented by Dr. Arnold Lada at semi-annual CSMA meeting. Secondary oil recovery reprint — Onyx Oil & Chemical Co., Jersey City 2, N.J.

Check 2456 opposite last page.

Vacuum rotary dryers are treated in two-page leaflet describing drying process and dryer design. Vacuum-rotary-dryer Leaflet — Goslin-Birmingham Manufacturing Co., Inc., Birmingham, Ala.

Check 2457 opposite last page.

N-substituted morpholines are explained in eight-page booklet. Included are physical properties, specification limits, and test methods. Vapor-pressure chart is a feature. Tech Info F-8640B—Union Carbide Chemicals Company, Div. of Union Carbide Corporation, 30 East 42nd St., New York, N. Y.

Check 2458 opposite last page.

Industrial services such as product research and development, applications, market research, and product and process control are described in "Services For You" — Foster D. Snell, Inc., 29 W. 15th St., New York 11, N.Y.

Check 2459 opposite last page.

Tertiary amine catalysts as used in manufacture of polyurethane foams are discussed in 10-page bulletin. Bul B6-R3 — Chemical Division, Armour and Company, 1355 W. 31st St., Chicago 9, Ill.

Check 2460 opposite last page.

Gear pumps and fluid motors are fully cataloged in Bul 810-S — Pump Division, Eastern Industries Incorporated, 100 Skiff St., Hamden 14, Conn.

Check 2461 opposite last page.

Bimetal dial thermometers are detailed in 12-page catalog which includes specifications and photos. Cat DT2-58 — Rochester Manufacturing Co., Rochester, N. Y.

Check 2462 opposite last page.

Industrial filters are reviewed in twelve-page booklet. Schematic diagrams and specifications are included, "Filters for Industry" — Industrial Filter Division, Komline-Sanderson Corporation, Peapack, N.J.

Check 2463 opposite last page.

Corrugated board for moisture-resistant boxes has technical information detailed in four-page folder. Specifications and performance data are also included. M/R board folder—Hinde & Dauch, Division of West Virginia Pulp and Paper Company, Sandusky, Ohio.

Check 2464 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Electrolytic conductivity measurement is topic of 32-page catalog describing theory and including photos and descriptions of equipment. Cat 23 — Industrial Instruments, Inc., 89 Commerce Rd., Cedar Grove, Essex County, N.J.

Check 2465 opposite last page.

Vertical crushers of the cylinder and nut-type, are outlined in 2-page bulletin. Closeup photograph, engineering drawing, and complete parts list is included. Bul 145A—Sprout, Waldron & Co., Inc., 130 Logan Street, Muncy, Pennsylvania.

Check 2466 opposite last page.

Adhesives' application is outlined in four four-page folders. All phases of adhesives' application are included in Adhesives' Application Folders — Shawinigan Resins Corporation, Springfield 2, Mass.

Check 2467 opposite last page.

Servomechanism-gear-train package design is outlined in 20-page booklet. Use of stock instrument plates and cluster gears in providing precision assemblies is detailed in Package-assembly Booklet — PIC Design Corporation, Subsidiary of Benrus Watch Co., Inc., 477 Atlantic Avenue, E. Rockaway, L.I., N.Y.

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Check 2470 opposite last page

NEW LITERATURE

Vibrating-screen-area estimation is dealt with in eight-page folder containing seven-step description of new estimating method along with appropriate charts and sample problem-solution. Screen-area-estimation Folder — Overstrom & Sons, Inc., 2213 W. Mission Road, Alhambra, Calif.

Check 2471 opposite last page.

AC-motor selection data, for motors of 1 to 200 hp, are incorporated in 12-page bulletin which includes frame-selection tables. Bul B-2103-4—Reliance Electric and Engineering Company, 24701 Euclid Ave., Cleveland 17, Ohio.

Check 2472 opposite last page.

Conveyor pulleys, for use where abrasive materials are handled, are fully specified in four-page bulletin. Bul 35-D—Sprout, Waldron & Co., Inc., Muncy, Pa.

Check 2473 opposite last page.

Safety grating is delineated in 28-page catalog which incorporates load charts and specifications. Cat 5911 — Products Division, Globe Company, 4000 S. Princeton Ave., Chicago 9, Ill.

Check 2474 opposite last page.

Pressure gages, needle throttling valves for service to 10,000 psi and/or 500°F, and dial thermometers are outlined in detail in Gage-Valve-Thermometer Cat — Marsh Instrument Co., Skokie, Ill.

Check 2475 opposite last page.

Industrial glycols are covered in 80-page booklet which includes extensive treatment of properties and uses. "Glycols" — Union Carbide Chemicals Company, Division of Union Carbide Corporation, 30 E. 42nd St., New York 17, N. Y.

Check 2476 opposite last page.

Thermocouple temperature-millivolt conversion tables are contained on four-page chart which folds in half to 8½ x 11" size and is punched for use in three-ring binder. Tables for converting °F to millivolt values are on one side; °C to millivolts on other. Chart's design eliminates index. May be obtained from Thermo Electric Co., Inc., Saddle Brook, N. J.

Check 2477 opposite last page.

Government-surplus buying information is outlined in 48-page booklet. List of government surplus depots and military installations where surplus is sold is included in Government-surplus Booklet which is available for \$1.00 from Aviation Surplus Center, York, Pa.

ULTRASONIC BREAKTHROUGH!



ONLY ACOUSTICA ULTRASONIC CLEANERS HAVE MULTIPOWER!

The Multipower transducer developed by Acoustica research, multiplies the power and efficiency of ultrasonic action. Cleaning is faster, better, labor costs are lower. Acoustica ultrasonic cleaners are built for performance and durability. They are engineered to the finest standards, unequaled in quality and value.

Off-the-shelf in capacities from 1 to 75 gal. or custom built to 5000 gal. and more. Expert Acoustica engineers can help you with your cleaning problems. Send for further information.

acoustica
LEADER IN ULTRASONIC RESEARCH

Acoustica Associates, Inc.
Dept. CP, Fairchild Court, Plainview, N. Y.
Send information describing advantages of Acoustica ultrasonic cleaners.

Name _____
Company _____
Address _____
City _____ Zone _____ State _____

Check 2478 opposite last page

CHEMICAL PROCESSING

Pollution-control papers delivered at recent air-stream pollution-control seminar held in connection with dedication of company's plant are contained in "Air-Stream Pollution Control" — American Cyanamid Company, 30 Rockefeller Plaza, New York 20, New York.

Check 2479 opposite last page.

Wire cloth, manufactured from any metal or alloy in nine basic weaves, is detailed in 94-page Wire Cloth Cat — Dept. F, The Cambridge Wire Cloth Co., Cambridge 6, Maryland.

Check 2480 opposite last page.

Catalyst dispersions recently developed are outlined in seven-page Kenmix Dispersion Bul — Kenrich Corporation, 57-02 48th St., Maspeth 78, N. Y.

Check 2481 opposite last page.

Permanent-magnet pulleys, incorporating ceramic magnet material, are delineated in Bul 1021 K — Stearns Magnetic Products, Division of Indiana Steel Products Company, 635 S. 28th St., Milwaukee 46, Wis.

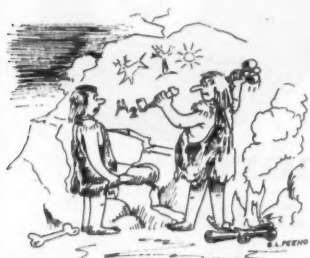
Check 2482 opposite last page.

Rigid urethane foams are reviewed in six-page technical data sheet, including formulations, properties, and production notes. Tech Data Sheet 71558 — National Aniline Division, Allied Chemical Corporation, 40 Rector St., New York 6, N. Y.

Check 2483 opposite last page.

Laboratory glassware is outlined in 36-page Supplement 3 to Cat LG-1 — Laboratory Glassware Sales Department, Corning Glass Works, Corning, N. Y.

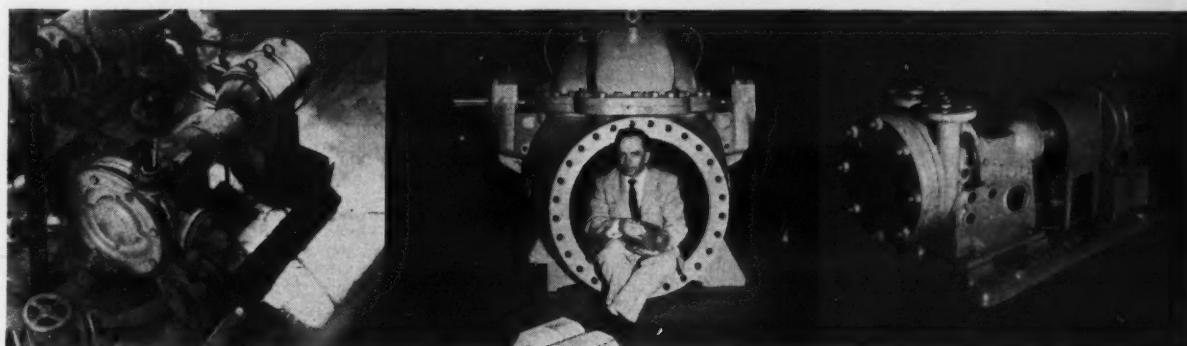
Check 2484 opposite last page.



"Oh, I suppose that's as good a symbol for water as anything."

PUMPAGE

Goulds news about pumps for process industries



Idea from a cosmetic bottle

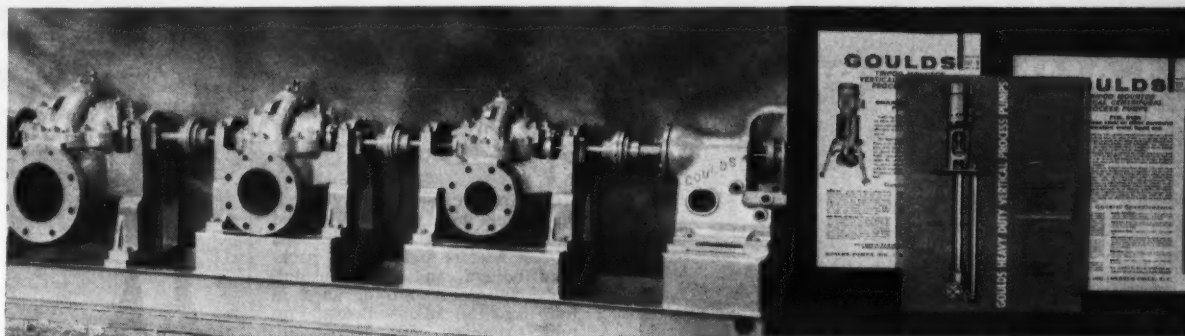
Cold wave lotion made from Evans Chemetics' thioglycolic acid comes to consumers in a bottle. A glass bottle. That set Evans to thinking: if glass prevents contamination in packaging, why can't it do the same job in processing? So they installed a Goulds-Pfaudler glassed pump. In it, glass is permanently fused to metal at every surface that contacts the pumpage. Result? Where expensive alloys were required to prevent contamination during processing, now smooth glass does the job... better! Maintenance and replacement problems ended too—for a full year after installation! Write for Bulletin 725.2.

Largest and smallest

The man dwarfed by the giant pump is a Goulds Application Engineer. Look closer. He's holding another pump, small enough and light enough to be held in one hand! His assignment: select the right pump for your specific need from all the pumps that fall within the range of Goulds' largest and smallest pumps. For instance—want to move a lot of liquid fast? That big job does it at 40,000 GPM! Need a small, stainless steel pump that you can use 24 hours a day for chemical circulating or transfer work? Get as little as 1 GPM with the little pump. Cut pumping costs with the right pump for your job.

Pump with a built-in "steam-bath"

When fat is a problem—try a steam bath! The steam bath we're speaking of keeps fats, wax, paraffin and other low-melting point solids fluid in your pumping system. It's "built-in" on the Goulds Fig. 3715 chemical pump to maintain high process temperatures—right at the pump. A steel steam jacket of full casing diameter keeps all the liquid in the pump hot. Can be furnished with new, or added to existing, pumps. You pump low melting point fluids or saturated salt solutions without "freezing"—to reduce down time in your operation. Write for Bulletin 725D17.



Tandem-mounted pump idea

Here's where it might pay you to put all your eggs in a single basket! One oil refiner set up four Goulds pumps in tandem, powered the whole works with one steam turbine. Advantages? The combined total horsepower allowed selection of a more efficient large turbine with reduced steam consumption—plus eliminating 3 turbines, bases and foundations. The two Goulds Fig. 3405 pumps in the

center handle rich oil at 300 and 375 GPM respectively, with heads of 211 feet. At the left is a Goulds Fig. 3405 that pumps 600 GPM of lean oil at 248 ft. head. Pump on the right is a Fig. 3755 for supplying still reflux at 155 GPM and a head of 149 feet. All pumps and the turbine are mounted on a common steel base.

News about vertical process pumps

Here's a complete rundown on what's new with heavy-duty vertical process pumps for handling corrosive liquids in the chemical process and allied industries. In many applications in the process field, the use of vertical pumps for transfer or other services offers many advantages. Advanced design provides for wet pit, dry pit and tripod-mounted pumps with maximum interchangeability of parts. These booklets list them all—and they're yours free. Just send to Goulds for your copy. Write Goulds Pumps, Inc., Dept. CP-69, Seneca Falls, New York.

GOULDS  **PUMPS**

Check 2485 opposite last page

**First choice of the rocket
and missile industry...**

**Three superlative Marsh products
are widely used and approved by
the aircraft and missile industry:**

MARSH Pressure Gauges...

because they combine the most advanced features ever found in pressure, vacuum and compound gauges. There is a Marsh Gauge for every conceivable application.

MARSH Needle Throttling Valves...

because they are guaranteed to give micrometer regulation at HIGH pressures—pressure up to 10,000 psi—and any temperature up to 500° F.

MARSH Dial Thermometers...

because they offer the precision and accuracy a precision industry demands. Most complete line; wide temperature ranges, dial sizes, patterns, finishes.

All Marsh products available with AND threads

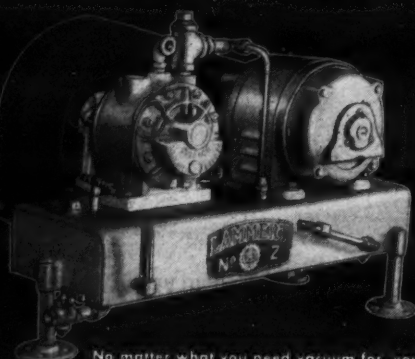
MARSH

*New catalog
contains all
details*

MARSHINSTRUMENT CO., Sales Affiliate of Jas. P. Marsh Corp. Dept. Z Skokie, Ill.
Marsh Instrument & Valve Co., (Canada) Ltd., 8407 103rd St., Edmonton, Alberta,
Canada, Houston Branch Plant, 1121 Rothwell St., Sect. 15, Houston, Texas

Check 2486 opposite last page

VACUUM LAMMERT PUMPS



No matter what you need vacuum for, you will get dependable service from automatically lubricated Lammert pumps. Capacities—4.3 to 225 cubic feet per minute. From medium to high vacuum (up to 20 microns of barometer).

Write for catalog showing the complete line, including specifications, of Lammert pumps and compressors.

LAMMERT & MANN CO., INC.

1753 Walnut Street, Chicago 12, Illinois, SEeley 3-0383

Check 2487 opposite last page

NEW LITERATURE

Chitin and chitosan in powder form are covered in 12-page pamphlet including properties and reactions. Kylan Pamphlet — Moretex Chemical Products, Inc., Spartanburg, S. C.

Check 2488 opposite last page.

Compacting system, including compacting mill, roller mill, and either gyratory or vibratory screen, is discussed in Bul 07B8836 — Industrial Equipment Division, Allis-Chalmers Manufacturing Co., 864 S. 70th St., Milwaukee 1, Wis.

Check 2489 opposite last page.

Zirconium plant is reviewed in eight-page pamphlet. Flow chart and photographs are included in Zirconium-plant brochure — Badger Manufacturing Company, 230 Bent Street, Cambridge, Mass.

Check 2490 opposite last page.

Process-control-system calibration is explained in 16-page catalog which also describes calibration instruments. Calibration System Cat—Technique Associates, Inc., 1413 N. Cornell Ave., Indianapolis 2, Ind.

Check 2491 opposite last page.

Stirrers and mixers for industrial use are pictured in four-page Bul 591 — Conn and Co., 11 South Marion Street, Warren, Pa.

Check 2492 opposite last page.

Polystyrene latex physical properties and application information are included in Latex 586 Bul — Plastics Merchandising-2, The Dow Chemical Company, Midland, Mich.

Check 2493 opposite last page.

Heat transfer equipment, including hairpin heat exchangers, fired indirect heaters, tank heaters, process heaters and coolers, packaged boilers, and other custom-built equipment, are depicted in four-page Bul 581 — Brown Fin-tube Company, 508 Huron St., Elyria, Ohio.

Check 2494 opposite last page.

Mechanical drive of chain-driven variable-speed type is shown in Book 2274 — Link-Belt Company, Prudential Plaza, Chicago 1, Ill.

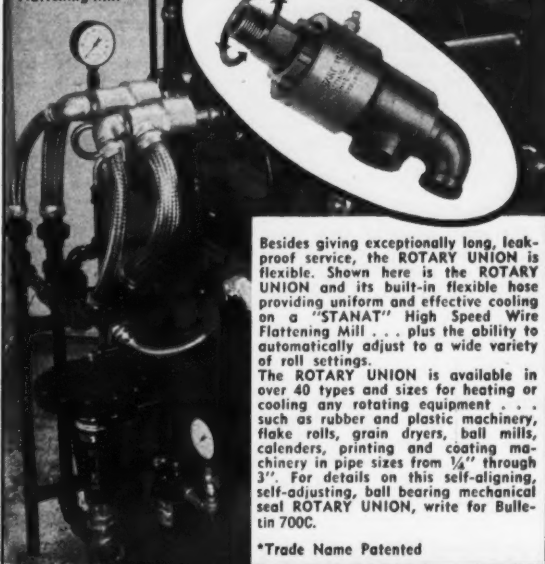
Check 2495 opposite last page.

Packaging standards for polyethylene film used with foods and drugs are included in Recommended Standard TS-5438—Commodity Standards Division, Office of Technical Services, U.S. Department of Commerce, Washington 25, D.C.

The ROTARY UNION*

... gives plus values

"STANAT" Wire
Flattening Mill



Besides giving exceptionally long, leak-proof service, the ROTARY UNION is flexible. Shown here is the ROTARY UNION and its built-in flexible hose providing uniform and effective cooling on a "STANAT" High Speed Wire Flattening Mill... plus the ability to automatically adjust to a wide variety of roll settings.

The ROTARY UNION is available in over 40 types and sizes for heating or cooling any rotating equipment... such as rubber and plastic machinery, flake rolls, grain dryers, ball mills, calenders, printing and coating machinery in pipe sizes from 1/4" through 3". For details on this self-aligning, self-adjusting, ball bearing mechanical seal ROTARY UNION, write for Bulletin 700C.

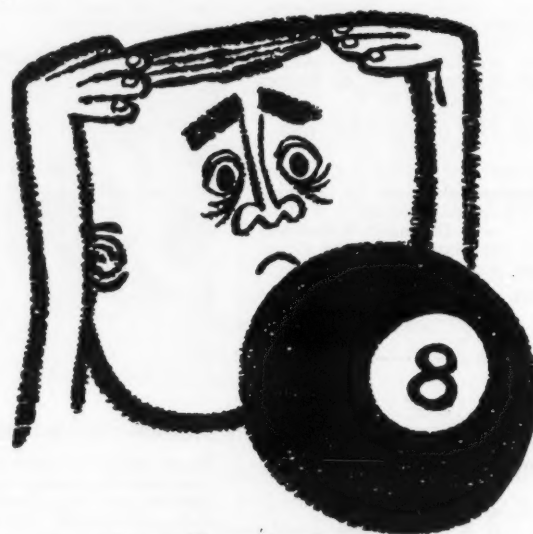
*Trade Name Patented

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PERFECTING SERVICE COMPANY, 332 Atandt Ave., Charlotte, N.C.

Baltimore—Buffalo—Camden, N. J.—Chicago—Cleveland—Los Angeles
New York—Providence—Hamilton, Ont.—Montreal—Toronto

Check 2496 opposite last page



**need more
information...**

Note there is a key number at the end of editorial articles or advertisements. To request more information circle the proper number on the convenient form opposite the last page. Send the form to us... we do the rest. Information comes direct to you. No obligation, of course.

CHEMICAL PROCESSING

NEW LITERATURE

Manometer theory and application are discussed in eight-page brochure covering principles and terminology. Manometer Brochure — Dynametrics Corporation, Northwest Industrial Park, Burlington, Mass.

Check 2497 opposite last page.

Package-handling conveyors are detailed in two 2-page bulletins. Bul 540 covers a roller-bed unit; Bul 610 refers to a slider-bed power-belt unit. Marketing Section, Dept. 160, The Oliver Corp., A. B. Farquhar Div., York, Pa.

Check 2498 opposite last page.

Precipitated calcium carbonates, for use as extender pigment in paints are covered in the bulletin, "Witcarbs in Paint" — Witco Chemical Company, Inc., 122 E. 42nd St., New York 17, N. Y.

Check 2499 opposite last page.

Pneumatic material handling developments are discussed in ASME talk reprint. This 12-page booklet includes many recent developments. "New Developments In Pneumatic Materials Handling" — Fuller Co., Subsidiary of General American Transportation Corporation, Catasauqua, Pa.

Check 2500 opposite last page.

Waste treatment equipment, including such items as settling tanks, collectors, conveyors, and feeders, is listed in Cat 952 — The Jeffrey Manufacturing Company, Columbus 16, Ohio.

Check 2501 opposite last page.

Instrument tubing, consisting of 2 to 37 tubes of copper, aluminum, or polyethylene, twisted together, is specified in Bul 458-E, Crescent Insulated Wire & Cable Co., Trenton 5, N. J.

Check 2502 opposite last page.

Zirconium and hafnium are topic of 16-page catalog which includes physical properties and process applications. Zirconium and Hafnium Cat — Mallory-Sharon Metals Corporation, Niles, Ohio.

Check 2503 opposite last page.

Teflon hose, in size range of 1/2 to 3", is summarized in Bul 4-42 — Hewitt-Robins, Stamford, Conn.

Check 2504 opposite last page.

Casters and wheels are subject of 16-page catalog. Full specifications are included. Cat. 130 — The Hamilton Caster & Mfg. Company, 1700 Dixie Highway, Hamilton, Ohio.

Check 2505 opposite last page.



WHY 500 BLUE CHIP COMPANIES LUBRICATE COSTLY MACHINERY WITH ALEMITE OIL-MIST SYSTEMS

An Alemite Oil-Mist Lubrication System provides safe, foolproof, automatic lubrication . . . increases machine output . . . reduces lubrication costs.

Designed for a wide range of applications. Oil-Mist provides constant, uniform lubrication of many sizes and types of bearings, from small sewing machine bearings to large steel mill back-up roll bearings or work roll bearings. Open type and enclosed gear trains and chain drives are lubricated by Oil-Mist when leakage problems exist. An Oil-Mist System is also ideal for

lubricating slides, ways and cams, where a minimum of continuous lubrication is required.

Used in both large and small plants. Alemite Oil-Mist Systems are now operating in hundreds of plants . . . reducing operating temperatures and bearing wear . . . eliminating housekeeping problems and contamination due to over-lubrication . . . reducing man-hours and down-time. Check your plant. Perhaps you, too, can benefit from the many important advantages of a modern Oil-Mist System.



Cut costs . . . reduce man-hours and machine down-time . . . extend bearing life . . . increase production . . . with a modern Alemite Oil-Mist Lubrication System

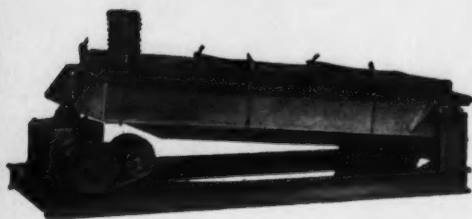
Write today for free Oil-Mist catalog!
Dept. K-69, 1850 Diversay Parkway, Chicago 14, Illinois



Check 2506 opposite last page

ROTEX[®]

SCREENERS GIVE



PROFITABLE PRODUCTION!

ROTEX FEATURES

- Low head room
- No screen blinding
- Fast screen changes
- Dependable service
- Durable construction
- Rugged construction

For over 40 years ROTEX Screeners have been widely used throughout industry. Today there are installations in the United States and over 25 foreign countries. Built for dependable service, ROTEX are long known for accuracy, capacity and operating economy.

ROTEX SCREENING ACTION:

The nearly level, gyratory motion, pioneered in ROTEX, conveys materials rapidly over screen surfaces with minimum vertical vibration or hop. This stratifies the material by particle size, rapidly passing undersize particles through the mesh openings. The results are clean separations of exacting accuracy coupled with high capacity. Designed for operating convenience, ROTEX Screeners pay for themselves by the economies they effect.

ROTEX WIDE SELECTION:

To meet your requirements: 25 standard models—one to five screen surfaces—many semi-standard and special models—sanitary and all-metal construction available.

Write for Bulletin 401 and information on your screening requirements. Our engineering staff will be pleased to cooperate with you.

MECHANICAL FEATURES

- All Metal Screen Box
- Self-Aligning Slide Bearings
- Quiet Running Counter-Balanced Drive
- Heavy Welded Structural Steel Base

ROTEX

The Orville Simpson Co.

1246 Knowlton St., Cincinnati 23, Ohio

Check 2507 opposite last page

NEW LITERATURE

Magnetic flowmeters are pictured in six-page catalog that incorporates discussion of principles of operation. Cat 10D1416—Fischer & Porter Company, 38 Jacksonville Rd., Hatboro, Pa.

Check 2508 opposite last page.

Blending, dispersing, emulsifying, as performed by homogenizers, dispersers, and colloid mills, are topics of Buls H-55, LH-55, SMD-55, and C-57 — Manton Gaulin Manufacturing Co., Inc., 55 Garden St., Everett 49, Mass.

Check 2509 opposite last page.

Explosives bag filling, closing, performance, and cost data are enumerated in eight-page pocket-size booklet, "13 Questions and Answers"—General Sales Department, Bemis Bro. Bag Co., 408 Pine St., St. Louis 2, Mo.

Check 2510 opposite last page.

Gear pumps, designed to be completely non-contaminating are tabulated in Gearchem® Pump Literature — Eco Engineering Co., 12 New York Ave., Newark, N. J.

Check 2511 opposite last page.

Styrene-methyl methacrylate copolymer properties and description are treated in four-page Tech Bul 171-121 — Plastics Merchandising-1, The Dow Chemical Company, Midland, Mich.

Check 2512 opposite last page.

Flakers are subject of two-page leaflet which includes discussion of flaking process and design of equipment. Flaker Leaflet — Goslin-Birmingham Manufacturing Co., Inc., Birmingham, Ala.

Check 2513 opposite last page.

Radioactivity-measuring instruments are detailed in 76-page catalog. More than 125 products for detecting, counting, and recording radioactivity are described in Cat R — Nuclear-Chicago Corporation, 229 W. Erie St., Chicago 10, Ill.

Check 2514 opposite last page.

Floodlight catalog of 177 pages includes detailed listing of floodlights and application theory and data. Cat 320—Crouse-Hinds Company, Syracuse 1, N.Y.

Check 2515 opposite last page.

Pneumatic conveyors—12-page report describes advanced methods of pneumatic conveying. Bul 531 —Dracco Division of Fuller Co., 4063 East 116th St., Cleveland 5, Ohio.

Check 2516 opposite last page.

STANDS ALONE!

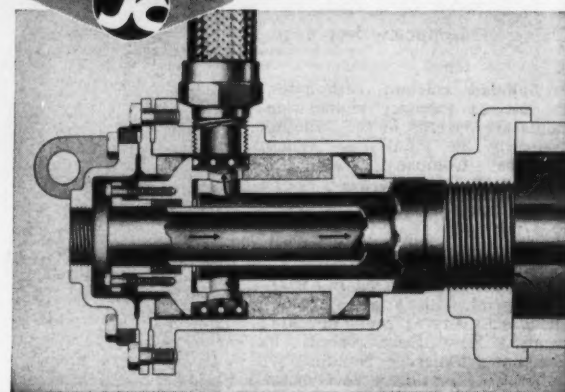
Type SN Johnson Rotary Pressure Joint



There's not another rotary joint like the Johnson Type SN. Used where inlet or outlet pipe must rotate with the roll—on certain paper machines, drilled rolls of rubber or plastic mills and calenders, double shell dryers, and the like. Needs no external supports of any kind. Like all Johnson Joints the Type SN seals without packing, needs no lubrication or adjustment.

Investigate Johnson Joints for all steam-heated or water-cooled rolls. Handle Dowtherm, Monsanto Aroclors, hot oils too. Sizes to 8". For data on Type SN write for Bulletin N-2002.

THE JOHNSON CORPORATION
826 Wood St., Three Rivers, Michigan

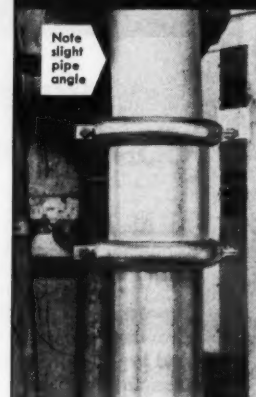


Check 2517 opposite last page

MARMAN

Flexmaster Pipe Coupling

Joins Pipe Without Threading



Installed Flexmaster Pipe Coupling shows minimum envelope clearance, minor pipe misalignment.

Quick, easy pipe connections can be made using the Marman Flexmaster Pipe Coupling. No threading is needed; just insert pipe and tighten two end coupling bolts. For use with lube oil, hot water and processing systems up to 260°F. Corrosion resistant, absorbs shock and vibration, accommodates minor misalignment. Sizes for 2½" and 3" pipe.



6400 Flexmaster Coupling

Flexmaster is an Aeroquip Trademark

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Marman Products are Covered by U.S. and Foreign Patents and Other Patents Pending

Check 2518 opposite last page

THAT'S INTERESTING

Off-beat polyols

Satisfactory separation of molybdenum compounds from the uranium found in pitchblende is being achieved by sorbitol and mannitol, it is reported in *Chemmunique*, a publication of Atlas Powder Co. These molybdenum compounds long have posed a problem in uranium recovery.

Heat damage knocked out

Metal clamps lined with water-soaked felt protects sensitive electronic parts from excessive soldering heat at Boeing Airplane Co. Device is called "heat sink" clamp. When components are soldered to circuit cards, damaging heat travels along lead wires from joint to component. New clamp is attached to lead wires, and damaging heat is dissipated as water in felt evaporates.

For more information on product at right, specify 2519 see information request blank opposite last page.



Here's proof of economy with FALK Shaft Mounted Drives

PROBLEM—For many years, a prominent Eastern abrasives manufacturer* experienced high maintenance and down-time costs, as well as excessive noise and vibration, in the operation of 19 pebble mills driven by open spur gears. Drive gears and jack shaft pillow blocks required frequent repairs or replacement, and trunnion shafts often failed, due to radial overloading of the bull gear when broken pinion teeth bottomed between gear teeth.

SOLUTION—After numerous unsuccessful approaches to these problems, the solution was found by mounting a Size 315J FALK Shaft Mounted Drive directly on the mill drive trunnion. This eliminated objectionable gear noise and vibration...greatly reduced costly down-time and loss of production...and cut annual maintenance and replacement expenses as indicated by the following figures taken from the customer's records:

Spur Gear-and-Pinion Drive

Bull Gears.....	\$ 56
Pinions.....	120
Pillow Blocks.....	90
VEE Belts.....	30
Trunnion (5-year life)....	100
Annual cost	<u>\$396</u>

FALK Shaft Mounted Drive

VEE Belts.....	\$ 30
FALK Shaft Mounted Drive (based on 10-year life).....	70
Annual cost	<u>\$100</u>

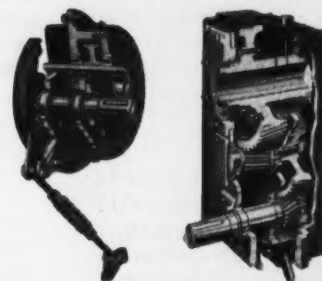
ANNUAL SAVINGS \$296

IF OBSOLETE DRIVES ARE COSTING YOU MONEY, a change to Falk All-Steel Shaft Mounted Drives can effect important savings in money and production. Used on almost any type of machine, these compact, rugged units are establishing new standards of economy and efficiency in many industries. Specify FALK Drives on your purchased equipment...For full details, write for Bulletin 7100.

*Name on request

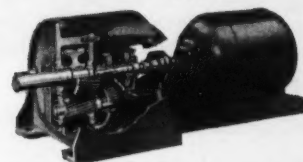
THE FALK CORPORATION, MILWAUKEE 1, WISCONSIN
MANUFACTURERS OF QUALITY GEAR DRIVES AND FLEXIBLE SHAFT COUPLINGS
Representatives and Distributors in Most Principal Cities

To get the right drive for your application, specify FALK®



SHAFT MOUNTED DRIVES

Horizontal or vertical units— $\frac{1}{2}$ to 50 hp—420 to 5 rpm—single and two double reduction ratios—output torque ratings up to 41,000 lb-in (consult factory for higher torque capacity).



ALL-MOTOR® MOTOREDUCTORS

Sizes up to 75 hp—furnished with or without standard foot-mounted motor—standard output speeds 1.2 to 520 rpm (with 1750 rpm motors)—ratios as high as 54,000:1 in semi-standard designs. Integral units (gearmotor type) also available. Ask for Bulletin 3100.

FALK Drives are available from factory and distributor stocks from coast to coast. Consult your Falk Representative or Distributor.

FALK

...a good name in industry

**pumping
something
special?**



**check these
special features**

*available with Yeomans Vertical
Wet Pit Centrifugal Pumps**



**sand
glass particles
and other abrasives**

Lubri-Vac® reduces by 95% the failure of bearings due to scoring by abrasive particles. Lubri-Vac constantly flushes bearings with lubricant, keeps foreign matter away. (An exclusive Yeomans feature included on all heavy-duty pumps.)

**ash
fly ash
cinders
bits of coal
corn foots
and other solids
contained in drainage**

A cradle pump with protective sleeves to protect shaft. Special manganese steel parts. Yeomans pumps including these features will give long life under the most severe abrasive conditions.

**potassium cyanide
sulphuric acid
jet fuel
melted naphthalene
and other
toxic or volatile
liquids**

Shaft seal is not under liquid pressure with Yeomans Vertical Wet Pit Pumps. This feature eliminates the leakage hazard which is present with horizontal pumps.

**molten phosphorous
acetic acid
hydrochloric acid
black liquor
and other corrosive
liquids**

Whatever the corrosive and/or abrasive liquid to be pumped—Yeomans has special ferrous and non-ferrous alloy parts to handle it.

*Vertical Wet Pit Centrifugal Pumps save floor space, require no priming—no costly liquid leaks as stuffing boxes are not under liquid pressure. Capacity range from 5 g.p.m. to 10,000 g.p.m.



2003-5 NORTH RUBY STREET, MELROSE PARK, ILLINOIS

YEOMANS

☐ Please send me the catalog, "Yeomans Heavy-Duty Wet Pit Pumps."

Name _____

☐ I wish to know how I may see Yeomans' 15 minute film on Wet Pit Pumps.

Company _____

Street _____

City _____ Zone _____ State _____

P-5915

Check 2520 opposite last page

NEW LITERATURE

Oil-lubrication system is subject of Oil-Mist Cat — Dept. K-69, Stewart-Warner Corporation, 1850 Diversey Pkwy., Chicago 14, Ill. Check 2521 opposite last page.

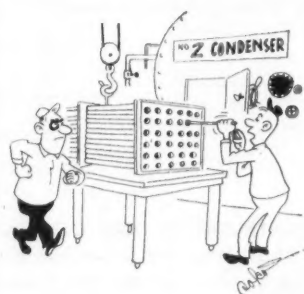
Amino-acid analyzer is depicted in four-page Folder SBMS—Spinco Division, Beckman Instruments, Inc., Palo Alto, Calif. Check 2522 opposite last page.

Lift trucks, with capacities from 6000 to 8000 pounds at 24" load center, have their performance, construction, and maintenance features covered in 12-page brochure. Challenger lift truck brochure—Hyster Company, 1003 Myers St., Danville, Ill. Check 2523 opposite last page.

Trickle valves for fluid bed processes are subject of 4-page bulletin. Uses of valve can boost catalyst density in material return dip legs by more than 50%. V-1458—The Ducon Company, Inc., 147 East Second St., Mineola, L.I., New York. Check 2524 opposite last page.

Wire-cloth line is tabulated in 12-page catalog which includes complete specifications. Wire Cloth Cat—Unique Wire Weaving Co., Inc., Hillside, N. J. Check 2525 opposite last page.

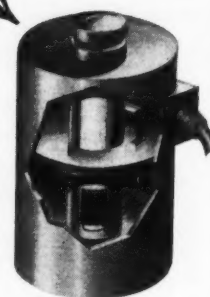
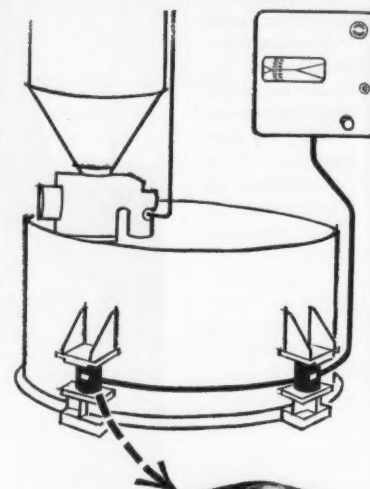
Circular slide rule for performing simple calculations is being offered on gratis basis to engineers and executives. Device multiplies, divides, and determines proportions quickly and easily. Pocket-size calculator may be obtained by letterhead request to General Industrial Co., 5738 Elston Ave., Chicago 30, Illinois.



"Hey, Fred! Did the cleaning rod come through?"

MEASURING QUANTITY?

Then do it the modern way... with accurate, rugged, trouble-free SR-4® Load Cells



Weigh or control chemicals faster and more accurately—yet with maximum simplicity—with B-L-H SR-4®

Load Cells. Installed as part of the tank support structure, no part of the measuring system comes in contact with the contents of the tank. Can be installed on tanks already in use. Output suitable for use with local or remote indicator, recorder or automatic dispensing control. Explosion-proof. Hermetically sealed—unaffected by dust, grease or moisture; long service life assured. Available in standard capacities of 50 through 200,000 lb., accuracies to $\pm 0.10\%$.

For more information on load cells and complete batching systems, write Dept. 16-F and ask for Bulletins 4355 and 4510

FIRST in force measurement



BALDWIN-LIMA-HAMILTON

Electronics & Instrumentation Division
Waltham, Mass.

SR-4® Strain Gages • Transducers • Testing Machines

Check 2526 opposite last page

CHEMICAL PROCESSING

THAT'S
INTERESTING

Changing times

Squaw Valley, in California's mighty Sierras, once was the summer camping place of the Washoe Indians. Next February, 1000 athletes representing 35 countries will compete there in the Winter Olympics.

Hold your fire!

The South African government has put its foot down on "back-yard" rocketeers. It has declared war on them "in the interest of public safety."

Ouch!

One-time use disposable hypodermic needles are finding increasing favor among physicians. The reason: to reduce incidence of cross-infection from one patient to another as a consequence of imperfect sterilization and cleaning methods, says the Surgical Products Division of American Cyanamid Co.

For more information on product at right, specify 2527 see information request blank opposite last page.



CES

Now - Pure, Pyrogen-free Sterile Water DIRECT FROM BOILER STEAM

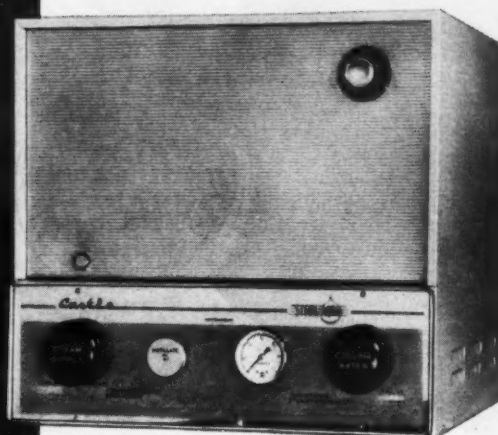
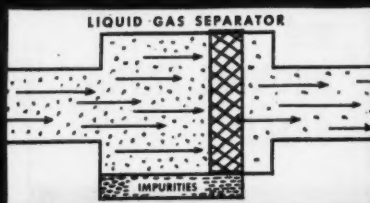
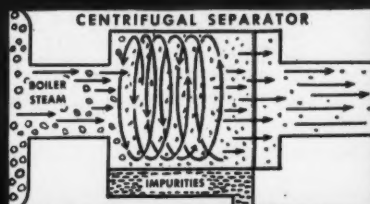
STERIL-AQUA[®] is not to be confused with ordinary water stills. The Castle STERIL-AQUA[®] System uses a completely new concept to produce high purity water.

No conventional still has these advantages.

- 1. Straight-Thru Process**—uses direct raw boiler steam. Eliminates secondary heating.
 - 2. Capacities**—5-500 gallons per hour. Operates at and produces continually its rated capacity.
 - 3. Maintenance**—direct process eliminates complex components. All components housed in single frame.
 - 4. Product**—meets all USP standards for pure, pyrogen-free sterile water.
 - 5. Space Saving**—STERIL-AQUA averages 1/5 size of comparable capacity conventional units.
- RESULT: LOW COST!** Pure, pyrogen-free, sterile water at a fraction of standard still costs.

THE CASTLE STERIL-AQUA[®]

DIRECT FROM BOILER STEAM
The new STERIL-AQUA system with a capacity range from 5 to 500 gallons per hour, is available for every need, from the smallest laboratory to the production line. Smaller units—5 (as shown), 12, and 25—are manually operated. Other units with manual, electric (remote), or full automatic controls. All STERIL-AQUA equipment is designed so the complete interior can be sterilized.



SEND FOR THIS FREE BROCHURE

An 8 page analysis of *direct from steam* STERIL-AQUA, with special emphasis on the economic advantages of the STERIL-AQUA System.



OTHER NEW CES DEVELOPMENTS Castle Pfaudler DRYER BLENDER STERILIZER: First completely automatic unit for drying, blending and sterilizing bulk products. Send for free brochure. Castle STEROX-O-MATIC: First completely automatic gas sterilizing system developed for industry. Send for free brochure.

*CES MEANS CASTLE ENGINEERED STERILIZATION

A CONTINUING development and research program to create more efficient and economic sterilization. Castle engineers are prepared to offer practical solutions to any and all of your sterilizing problems.

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Cincinnati, Ohio: Roselawn Center Bldg.
Houston, Texas: 1607 Jefferson Avenue
Pensacola, Fla.: Chem-Quip Co., 1102 Texar Drive

Check 2528 opposite last page

NEW LITERATURE

Liquid-level control for electronic systems is analyzed in Bul F-85 — Fisher Governor Company, Marshalltown, Iowa.

Check 2529 opposite last page.

Motor couplings are depicted in four-page folder which includes selection information. Folder 2875 — Link-Belt Company, Prudential Plaza, Chicago 1, Ill.

Check 2530 opposite last page.

Sodium-chlorite product for bleaching, oxidizing, and stripping textiles, is previewed in 26-page Textone Booklet — Chemicals Division, Olin Mathieson Chemical Corporation, Baltimore 3, Maryland.

Check 2531 opposite last page.

Duplex tubes and how they have helped solve corrosion problems in condenser and heat exchange equipment is discussed in a 24-page publication, "Solving Corrosion Problems in Industry" — Bridgeport Brass Co., 30 Grand St., Bridgeport 2, Conn.

Check 2532 opposite last page.

Dry feeders, volumetric extrusion type, are discussed in 16-page bulletin. Included are dimensional planographs of all sizes of equipment for either manual or automatic operation in proportion to flow, pH, etc. Bul 215—Infilco Inc., PO Box 5033, Tucson, Ariz.

Check 2533 opposite last page.

Steel fittings of stainless, forged, and forged-alloy types are reviewed in Fitting Cat — Camco Fittings, Inc., North Haven, Conn.

Check 2534 opposite last page.

Ductile iron catalog tabulates complete line including pipe, tube, casing, fittings, and castings. Grades, specifications, uses, and applications are included in 36-page Ductile Iron Cat—American Cast Iron Pipe Company, PO Box 2603, Birmingham 2, Ala.

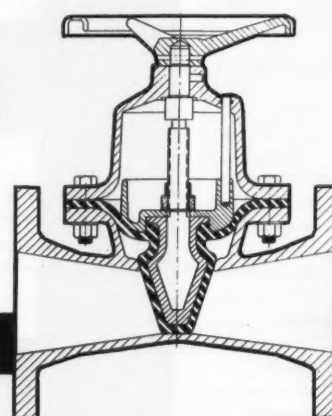
Check 2535 opposite last page.

Dimer acid patent abstracts and journal references are contained in 28-page Tech Bul 412 — Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio.

Check 2536 opposite last page.

**new features
CUT VALVE COSTS
and
PROVIDE EXTRA
SAFETY**

DIA-PLUG



POSITIVE CLOSURE

ASSURED Metal plug is molded to rubber or plastic forming the one piece combination of diaphragm and plug . . . for short called Dia-Plug . . . will close dead tight even if diaphragm is damaged.

MAINTENANCE AT MINIMUM Working parts are isolated by diaphragm from flow material — no clogging, no abrasion on working parts. Working parts and plug can be replaced on the line.

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Write for complete details and information:

DIA-PLUG VALVE CORP.

1622-A FILLMORE AVENUE
BUFFALO 11, NEW YORK

Check 2537 opposite last page

CHEMICAL PROCESSING

NEW LITERATURE

Storage racks—Four-page bulletin shows gravity type racks available for live storage and order-picking applications. Bul R-100—Lamson Corporation, Syracuse, N. Y.

Check 2538 opposite last page.

Autolyzed-brewers'-yeast fractions are specified in three pages of Brewers' Yeast Fraction Literature—Amber Laboratories, Inc., 3456 N. Buffum St., Milwaukee 12, Wis.

Check 2539 opposite last page.

Vibrating screen enclosures are covered in two-page Leaflet 26B-9139—Allis-Chalmers Manufacturing Company, Milwaukee 1, Wisconsin.

Check 2540 opposite last page.

Urethane resin is subject of three bulletins. Descriptive introduction, types and names of available mold-release agents, and properties of catalysts for use with resin, are covered in series of Urethane Resin Buls—Thiokol Chemical Corporation, Trenton 7, New Jersey.

Check 2541 opposite last page.

Industrial nozzles are subject of 32-page catalog which contains specific data on spray angles, dimensions, types of connections, and capacity vs pressure. Cat 59 is available on company letterhead requests to Industrial Nozzle Div., Wm. Steinen Mfg. Co., 45 Bruen St., Newark 5, N. J.

Electronic weighing is subject of 12-page booklet explaining theory, instrumentation, economics, remote-recording data, and history. Electronic Weighing Booklet—Streeter-Amet Company, Grayslake, Ill.

Check 2542 opposite last page.

Gas analyzers of orsat type are detailed in 12-page brochure. Photographs and specification tables are included in Publication 55-668-27—The Hays Corporation, Michigan City, Ind.

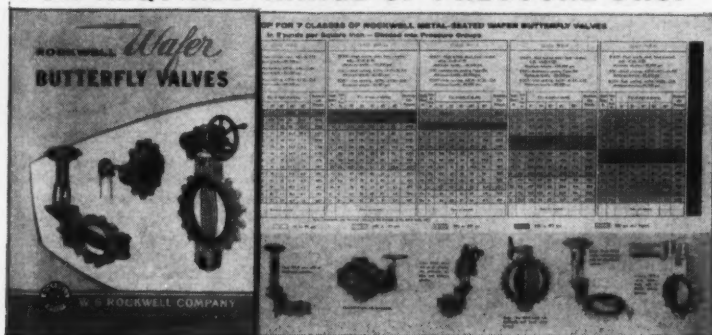
Check 2543 opposite last page.

Circulating seal is depicted in four-page brochure, "Too Hot To Handle?"—Durametallic Corporation, 2104 Factory St., Kalamazoo, Mich.

Check 2544 opposite last page.

Now! SELECTION MADE EASY

OF THE "WAFER" BUTTERFLY VALVE YOU NEED FOR REQUIRED RANGE OF PRESSURE DROP



This new Bulletin No. 583 gives all the facts to help you select just the size and construction of valve for your air, gas or liquid lines. Illustrations—charts—tables are arranged in a practical, easy-to-use manner. Write for your copy.



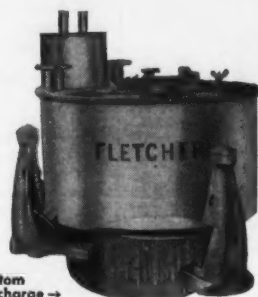
W. S. ROCKWELL COMPANY

Valves—Butterfly · Slide · Diaphragm · Special

2209 Elliot Street • Fairfield, Conn.

Check 2545 opposite last page

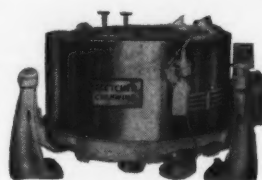
Only FLETCHER makes a CENTRIFUGAL for every purpose



Bottom Discharge →

TORNADO

40" to 48" basket,
6.4 to 16 cu. ft.



CHEMWIND

30" to 60" basket,
2.8 to 12½ cu. ft.

HURRICANE

20" to 36" basket,
.9 to 10 cu. ft.



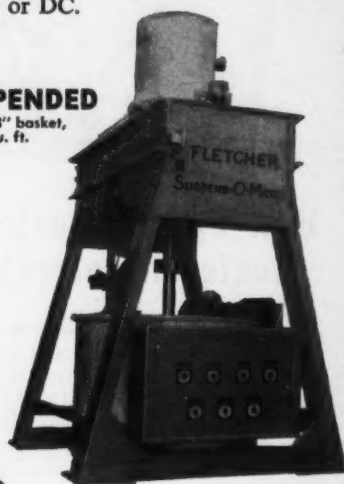
CYCLONE

17" to 30" basket,
1.2 to 5.3 cu. ft.

From the 48" basket tonnage production Tornado or Suspended down to the laboratory scale models, Fletcher has the centrifugal to solve your problem. These machines are fully automatic, have variable speeds and can be equipped with every type of drive—fluid mechanic, pneumatic or electric AC or DC.

SUSPENDED

20" to 48" basket,
1 to 16 cu. ft.



LABORATORY MODELS for Pilot, .20 cu. ft. Rugged, compact machine combines functions of extractor, separator and clarifier. Results from this test unit can be accurately scaled up to production unit.

All Fletcher centrifugals can be made of carbon or stainless steel—and can be lined with lead, rubber or any acid-resisting material.

WHEN in Philadelphia Visit The Fletcher Operating Centrifugal Exhibition.

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☐ Tornado ☐ Suspended ☐ Chemwind ☐ Hurricane ☐ Cyclone ☐ Pilot Model

NAME & TITLE

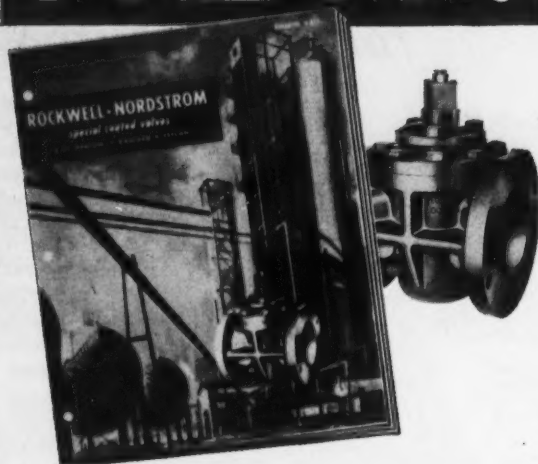
ADDRESS

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CITY & STATE

Check 2546 opposite last page

NEW!



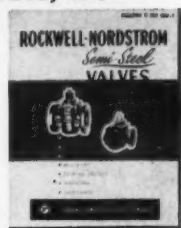
How special coated valves cut costs on corrosion services

This new booklet describes how special coatings applied to Rockwell-Nordstrom semi-steel or steel valves give the corrosion resistance of costly, special alloys at a fraction of the cost. Find out how you can get tighter shut-off, easier, more dependable valve control on even toughest services . . . and at lower cost.

These free booklets can help you cut your valve costs, too



Details on Rockwell-Nordstrom steel, stainless, bronze, Monel and other corrosion resisting valve patterns.



Details on Rockwell-Nordstrom semi-steel valves for normal temperature, normal pressure services plus special valve accessories.

Write today for these Rockwell-Nordstrom valve booklets. They'll help you get better flow control at lower cost. Rockwell Manufacturing Company, Pittsburgh 8, Pa. Canadian Valve Licensee: Peacock Brothers Ltd.

ROCKWELL-Nordstrom VALVES

another fine product by

ROCKWELL



Check 2547 opposite last page

NEW LITERATURE

Strip-chart recorder with continuous integration is described in four-page specification. Details are given on how potentiometer measures, records, and totalizes area under each peak of a chromatography spectrum. Specification S153-20—Industrial Division, Minneapolis-Honeywell Regulator Company, Wayne and Windrim Aves., Philadelphia 44, Pa.

Check 2548 opposite last page.

Fork-lift truck has operating and maintenance features described in six-page bulletin. Included are details on how peak maneuverability has been incorporated through rear-wheel drive and by recessing mast between load wheels. Circular 37—Dept. R9-2, Lewis-Shepard Products, Inc., 125 Walnut St., Watertown 72, Mass.

Check 2549 opposite last page.

Urea prills 46% nitrogen characteristics are listed on single-sheet Urea Prills 46% Nitrogen Bul — Grace Chemical Division, W. R. Grace & Co., 147 Jefferson Ave., Memphis 3, Tenn.

Check 2550 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Filter felts for air, gases, and liquids are treated in technical data sheet. Performance characteristics and selection of proper felts are included in Tech Data Sheet 15 — Engineering and Research Division, American Felt Company, Glenville, Conn.

Check 2551 opposite last page.

Vinyl wrinkle finishes are treated in five-page technical bulletin, describing use of vinyl plastisols, organosols, and solutions in formulation of vinyl wrinkle coatings. "Vinyl Wrinkle Finishes"—Union Carbide Plastics Company, Division of Union Carbide Corporation, 30 E. 42nd St., New York 17, Y.

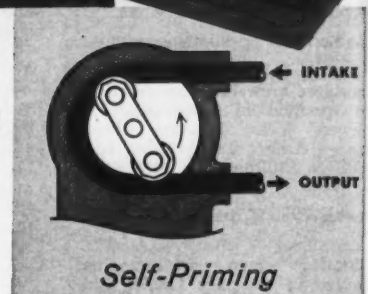
Check 2552 opposite last page.

Cobalt and its uses are subject of new illustrated quarterly review. Included in 43-page first issue are articles on uses of cobalt and high-temperature alloys, in addition to a section containing 68 abstracts from current technical literature. First issue, for December 1958 of Cobalt may be obtained by letterhead request to Cobalt Information Center, c/o Battelle Memorial Institute, 505 King Ave., Columbus 1, Ohio.

THE VERSATILE NEW RANDOLPH PUMP

Safely and efficiently handles...

- CORROSIVES
- ABRASIVES
- STERILE SOLUTIONS
- GASES



Operates on a principle designed to eliminate all contact of moving parts with the material being pumped. A tube is threaded through the pump body where it is subjected to the squeegee action of a double rotor. The result is a smooth flow of liquid or gas through the tube. Ideal for jobs where corrosion, contamination or abrasion is a problem. Two models—54 and 185 gallons per hour. Available with or without motor; also with speed controls and explosion-proof fittings.

For dealers in your area contact

THE **Randolph** COMPANY 1018 Rosine St.
Houston 19, Texas
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Check 2553 opposite last page

MOVE MATERIALS THRU BINS HOPPERS CHUTES



Navco Air Vibrators have a patented one-piece design for trouble-free operation. No need to stock spare parts—no assembly bolts, housing springs, separate striking plates, or grooved pistons in Navco Vibrators. Complete line for bins, hoppers, chutes, R. R. Cars, concrete forms, and batching. Now being specified by the country's leading automotive production foundries.

POUNDING IS EXPENSIVE
wastes time, damages equipment

FREE! 26-page Catalog
Detailed information on models and applications
Write Dept. CP-6

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CHEMICAL PROCESSING

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Do you know that the magazine can come to you personally without charge, to your designated address?

If you . . .

would like to receive it and if you qualify, the publisher will add your name to the more than 50,000 key men in the chemical processing industries who receive each issue regularly.

The necessary qualifications are outlined on the request form that can be found opposite the inside back cover.

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Perhaps . . .

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Your application for subscription is welcomed.

For more information on product at right, specify 2555 see information request blank opposite last page.



UNHARMED

by water...fumes...vibration

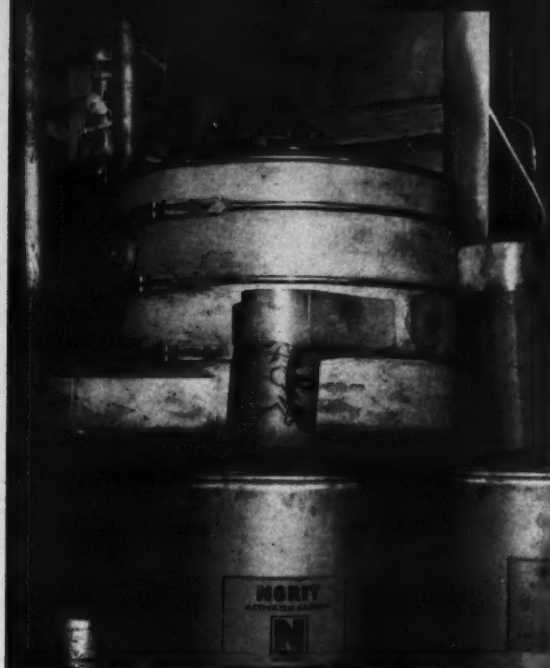
—the pipe insulation that's worth more money! You can't match UNIBESTOS for stamina. It was boiled in water for 72 hours to pass a recent certification test. Result: no opening-up of longitudinal or butt joints; almost complete absence of fraying; no mushing or falling away from pipe. 24 hours of drying restored initial characteristics without change in form or function. No other insulation is so *clean and easy* to cut—so *quick and simple* to apply—so *durable* in service. Temperatures to 1200° F. Sizes to 44" o.d. Single-Layer thicknesses to 5". Ask for Catalog F76-321 with exclusive "J" Factor Tables. Union Asbestos & Rubber Company
General Sales Offices: 1111 W. Perry St.,
Bloomington, Illinois. Distributors
in Principal Cities

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UNIBESTOS®

the pipe insulation
that's worth more money

Carbon screened- 14 times faster



Efficient three-deck SWECO Separator screens granular activated carbon into three different fractions at rates up to 2700 lbs./hr. at the American Norit Company, Jacksonville, Fla.

American Norit wanted to increase production rates on their activated carbon. This material is used for purification and refining in the chemical, food and related industries.

A rectangular screening device could not solve the company's problem.

SWECO District Engineers demonstrated how a multi-deck SWECO Separator could screen several sizes of American Norit's own material in one operation - and at increased production rates.

American Norit then installed a 48" dia. SWECO Separator - equipped with screen cloths for various material sizes needed. This 3-deck SWECO unit can handle a throughput of activated carbon granules up to 2700 lbs. per hour - 14 times the 200 lbs. hourly rate of previous screening equipment.

If you have a screening problem, write for a test demonstration in your plant, on your own material. Or send for new 20-page catalog and screening data on your specific material.

Write Dept. S-305-3



Southwestern Engineering Company
4800 Santa Fe Avenue, Los Angeles 58, California
Engineers - Constructors - Manufacturers

SEPARATORS FOR THE CHEMICAL INDUSTRY

Check 2556 opposite last page

NEW LITERATURE

pH recorder components, consisting of electrode assembly, amplifier, and potentiometer recorder, are delineated in three bulletins. Charts, tables, and drawings are utilized in Buls E12-4, E67-5, E67-6 - Bailey Meter Company, 1050 Ivanhoe Rd., Cleveland 10, Ohio.

Check 2557 opposite last page.

Absorption spectrophotometry is considered in eight-page pamphlet which includes information on suitability of solvents for spectrophotometric studies. "Spectrophotometry and the Chemist" - Matheson Coleman and Bell, 2909 Highland Ave., Norwood 12, Ohio.

Check 2558 opposite last page.

High-aromatic-fuel effect on oil-resistant elastomers, as determined in testing, is explained in 12-page bulletin, High-aromatic-fuel Test Report - Thiokol Chemical Corporation, 780 N. Clinton Ave., Trenton 7, N. J.

Check 2559 opposite last page.

All-metal conveyors, in steel, aluminum, and stainless steel are featured in eight-page bulletin. Features are pictured and described, specifications are given. Includes chart for figuring horsepower. "Armorbelt Unitized All Metal Conveyor" - M-H Standard Corporation, 513-521 Communipaw Ave., Jersey City 4, N. J.

Check 2560 opposite last page.

Instrumentation literature, including product catalogs, specifications, technical bulletins, industry bulletins, systems bulletins, and instrumentation data sheets, is indexed in 21-page Bul G2-1a - Industrial Division, Minneapolis-Honeywell Regulator Company, Wayne and Windrim Avenues, Philadelphia 44, Pa.

Check 2561 opposite last page.

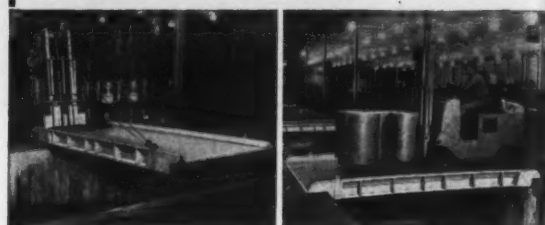
Anhydrous hydrogen chloride process and operating information is included in four-page brochure. Typical operating requirements, plant capacities, product analysis, and flow diagram are included in "Hydrogen Chloride" - Girdler Construction Division, Chemetron Corporation, P. O. Box 174, Louisville 1, Ky.

Check 2562 opposite last page.

Liquefied-gas containers are pictured in six-page folder. Descriptions, design features, and performance data are included in Folder F-1254 - Linde Company, Division of Union Carbide Corporation, 30 E. 42nd St., New York 17, N. Y.

Check 2563 opposite last page.

BRIDGING PROBLEM SOLVED!



by Magliner Movable Magnesium Bridges

A sunken, in-plant railroad spur divided the warehouse of the Dearborn Chemical Company, preventing efficient power trucking of materials between the storage areas. Needed: a movable, low-cost, bridging system that would not interfere with railcar spotting, loading and unloading.

After considering many types of spanning equipment, the company selected Magliner Magnesium Bridges as the practical solution to their problem. Today, these rugged Magliners provide bridge-aisleways for power truck traffic moving materials from one end of the warehouse to the other. *No detours, no delays!* Heavy loads (up to 10,000 lbs.) move continuously over the bridges . . . smoothly and easily. *Magnesium-light*, the bridges are easily moved to allow ample dock and rail space for car spotting, loading and unloading.

Magliner Magnesium Bridges are available in many lengths, capacities and models - movable, draw-bridge, rail-based, etc. Tell us your bridging problem . . . we'll be glad to help you solve it.

WRITE FOR JOB REPORT MB-401

MAGLINE INC.

P.O. Box 176, Pinconning, Michigan

Canadian Factory: Magline of Canada, Ltd., Renfrew, Ont.



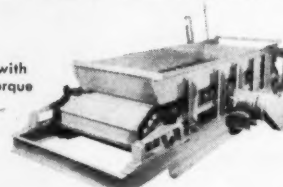
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WET OR DRY, GRANULAR OR LUMPY

Material Flows Steadily
For Dependable, Uniform Feeding,
With A MECO Automatic Feeder!

APRON FEEDERS

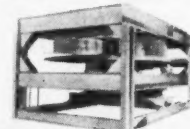
Apron Feeder with
Ratchet and Torque
Arm drive.



Built for heavy duty and long, trouble-free service, MECO Apron Feeders assure a positive, dependable feeding action. They are self cleaning, easy to control, and require little power to operate. Designed primarily for moving wet, sticky, or plastic material, they can also feed dry and heavy lumpy material. Can be sprocket driven or pulley driven, or with torque arm, as shown. Write for Bulletin No. 573.

HEAVY DUTY DISC FEEDERS

Model SR Feeder
(Single Speed)



Available in five models, single or variable speed, for specific feed range requirements from a mere trickle up to 80 tons per hour. Furnished as complete units ready for installation, MECO Disc Feeders are designed for automatically controlled feeding, batching or proportioning. They can be used for sand, clay, shale, chemicals, or any crushed or ground materials. Rate of discharge can be varied.

THE MANUFACTURERS EQUIPMENT COMPANY

216 MADISON AVE. • DAYTON 4, OHIO • Phone BA 2-5565

Check 2565 opposite last page

CHEMICAL PROCESSING

NEW LITERATURE

V-belt drives are reviewed in 44-page bulletin, incorporating tables of pre-engineered drives, horsepower capacities, belt speeds, center distances, and sheave diameters. Bul A695—Dodge Manufacturing Corporation, Mishawaka, Indiana.

Check 2566 opposite last page.

Manufacturers' representatives are listed in "1959 Verified Directory of Manufacturers' Representatives." This 203-page directory is available at \$20.00 from Manufacturers' Agent Publishing Co., 505 Fifth Ave., New York 17, New York.

Methylated compounds and nitrogen heterocyclics now being offered in development are subject of folder, "Chemicals for Research" — Market Research & Development Dept., Ansul Chemical Company, Marinette, Wis.

Check 2567 opposite last page.

Rare-earth-oxide data are outlined in single-page Cat Sheet 1002 — Research Chemicals, Division of Nuclear Corporation of America, Box 431, 170 W. Providencia St., Burbank, Calif.

Check 2568 opposite last page.

Variable-speed pulleys are cataloged in 12-page Bul 4101—T. B. Wood's Sons Company, Chambersburg, Pa.

Check 2569 opposite last page.

Progressing-cavity pumps, available for service to 500 gpm and/or 1000 psi, are outlined in Bul 30 CP — Robbins & Myers, Inc., Springfield, Ohio.

Check 2570 opposite last page.

Manometer-type flowmeter is explained in single-sheet specification. Physical properties are included in Specification 10B1700 — Fischer & Porter Co., 33 Jacksonville Rd., Hatboro, Pa.

Check 2571 opposite last page.

Stacking truck designed for narrow-aisle application is shown in four-page bulletin. Truck has 2000-pound capacity. Bul 911—The Raymond Corporation, 63-172 Madison St., Greene, N. Y.

Check 2572 opposite last page.

Motor applications are dealt with in 16-page booklet. Polyphase, single-phase, and DC motor-selection charts are incorporated in Form 270 A—Century Electric Company, 18th & Pine Streets, St. Louis 3, Mo.

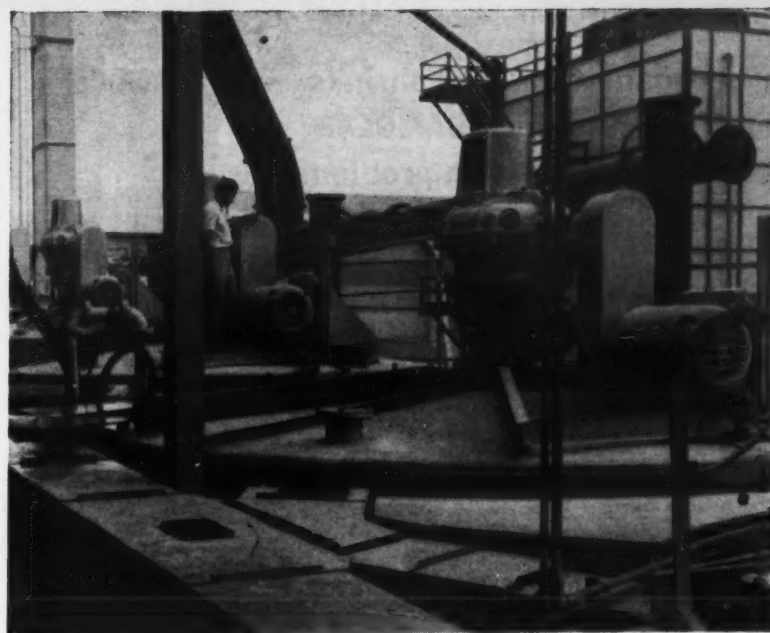
Check 2573 opposite last page.

Silicagel production by continuous process is analyzed in four-page bulletin. Detailed description of process, schematic flow sheet, and information on materials-handling problem are included in Bul I-34 — Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pa.

Check 2574 opposite last page.



"I grant you we concentrate better with our eyes closed . . . but you were snoring!"



How to stir up 700 tons of rock

Every day, more than 700 tons of phosphate rock and 600 tons of 98% sulfuric acid cascade into these big tanks.

Out of the tanks come 650 tons of 32% P_2O_5 phosphoric acid and many more tons of coarse, uniform, fast-filtering gypsum.

How does American Cyanamid Company handle this mammoth mixing job at its big triple superphosphate plant in Brewster, Fla.? *With just six LIGHTNIN Mixers.*

Controlled mixing Designed, engineered and equipped by Dorr-Oliver, this plant utilizes one 30-hp and five 60-hp mixers to handle the entire mixing load in its two huge premixers and four reactors. They provide the intense but closely controlled agitation needed for top yields.

Turbine-type LIGHTNIN Mixers also keep seed tanks mixed uniformly in the plant's three-stage vacuum evaporator system where phosphoric acid is concentrated to 54%. Still other LIGHTNIN Mixers help to neutralize process water and acid wastes in the efficient water-reclamation system.

What this means to you No matter how big—or how small—you want your fluid-mixing operations to be, you get *guaranteed* results when you mix with LIGHTNIN Mixers. For service and equipment that help you get a process onstream faster . . . trim your mixing costs to a minimum, see your LIGHTNIN Mixer representative. He's listed in Chemical Engineering Catalog. Or write us direct.

"Lightnin® Mixers"

MIXCO fluid mixing specialists

MIXING EQUIPMENT Co., Inc., 185-f Mt. Read Blvd., Rochester 3, N. Y.
In Canada: Greey Mixing Equipment, Ltd., 100 Miranda Ave., Toronto 19, Ont.

Check 2575 opposite last page

This propane tank wall shrinks —but free-standing FOAMGLAS® solves the insulation problem

The strength of FOAMGLAS

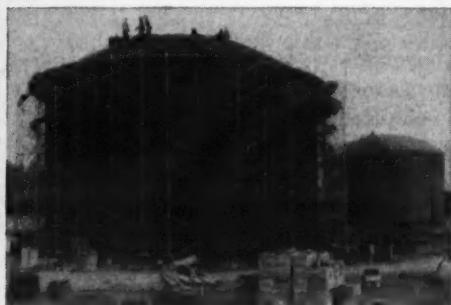
solved an unusual insulation problem posed by contracting tank walls in the nation's first refrigerated propane storage plant. Designed and built by Stone & Webster Engineering Corp. for the Atlanta Gas Light Company, the storage facilities at Riverdale, Georgia, consist of three steel tanks. Each is 70 ft. in diameter and 52 ft. high with a capacity of 1,297,500 gallons of refrigerated propane.

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Pittsburgh Corning offers a complete line of mastics, tank coatings and other accessory materials specifically designed for use with FOAMGLAS.



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CORNING

Check 2576 opposite last page

NEW LITERATURE

Polyethylene processing information is contained in a folder designed as reference file. Guide chart listing resin properties essential for best results in specific applications is included in Polyethylene Processing Folder — U. S. Industrial Chemicals Co., Division of National Distillers and Chemical Corporation, 99 Park Ave., New York 16, N. Y.

Check 2577 opposite last page.

Digital processor is subject of six-page bulletin, including complete descriptive data and explanation of operational principles. Bul 3004—Systems Division, Consolidated Electrodynamics, 300 North Sierra Madre Villa, Pasadena, Calif.

Check 2578 opposite last page.

Centrifugal compressors are subject of 20-page bulletin which incorporates complete description and analysis of operating principles. Bul 909—American Blower Division, American Radiator & Standard Sanitary Corporation, 8111 Tireman Ave., Detroit 32, Michigan.

Check 2579 opposite last page.

Butyl-rubber-compound resistance to ozone and to fire-resistant hydraulic fluids is referred to respectively in 12-page Bul 105-1 and 8-page Bul 102-1—Thiokol Chemical Corporation, 780 N. Clinton Ave., Trenton 7, N. J.

Check 2580 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Test sieve shakers are listed in single-page Test Sieve Shaker Leaflet—Syntron Company, 110 Lexington Ave., Homer City, Pennsylvania.

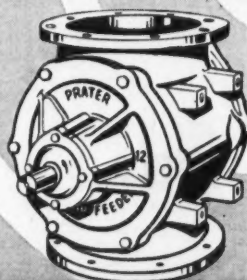
Check 2581 opposite last page.

Speed reducers of worm-gear type are detailed in eight-page folder which gives specification tables. Folder 2724—Link-Belt Company, Prudential Plaza, Chicago 1, Illinois.

Check 2582 opposite last page.

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Check 2583 opposite last page

NEW LITERATURE

Industrial weighing through electronics is explained simply in 12-page booklet. Covers history and development, theory, instrumentation, economic considerations, general data for instrumentation and remote recording. "Industrial Weighing Through Electronics"—Streeter-Amet Company, Grayslake, Ill.

Check 2584 opposite last page.

Conductor housing for high-voltage loads, in which each phase conductor is enclosed by individual metal housing, is reviewed in 20-page Bul 2604-1A—I-T-E Circuit Breaker Company, 1900 Hamilton St., Philadelphia 30, Pa.

Check 2585 opposite last page.

Truck selector—Guide to selection of industrial trucks fills 20 pages. Over 150 models to fit all requirements are illustrated. Selection of pallets and skids and attachments is covered. Industrial Trucks Selector Guide—Automatic Transportation Company, Division of The Yale & Towne Manufacturing Company, 149 W. 87th St., Chicago 21, Ill.

Check 2586 opposite last page.

Data on 2-mercaptoethanol is presented in eight-page 2-Mercaptoethanol Bul — Union Carbide Chemicals Company, Division of Union Carbide Corporation, 30 E. 42nd St., New York 17, N. Y.

Check 2587 opposite last page.

Packaged boilers are outlined in eight-page bulletin. Information concerning design, applications, and specifications are included in Bul 1251—Orr & Sembower, Inc., Reading, Pa.

Check 2588 opposite last page.

Screw conveyors, obtainable in any diameter and pitch, are depicted in four-page Cat 1058—Central Mine Equipment Company, 6200 N. Broadway, St. Louis 15, Missouri.

Check 2589 opposite last page.

Horizontal and vertical pumps are outlined in two bulletins which aid in selection of proper type for given task. Buls C-355 (horizontal) and V-837 (vertical) — Taber Pump Co., 291 Elm St., Buffalo 3, New York.

Check 2590 opposite last page.

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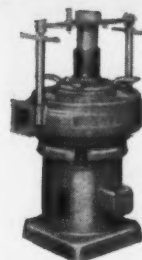
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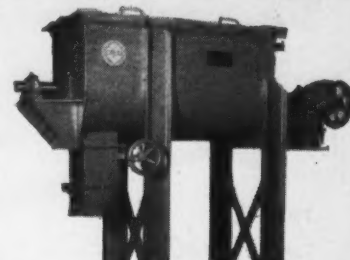
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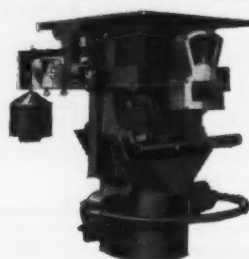
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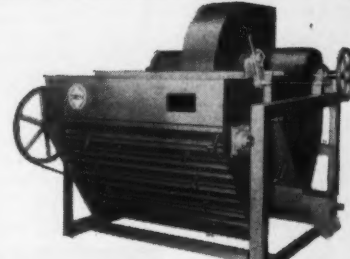
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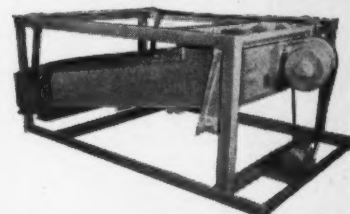
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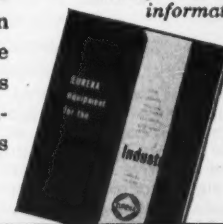


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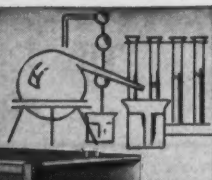


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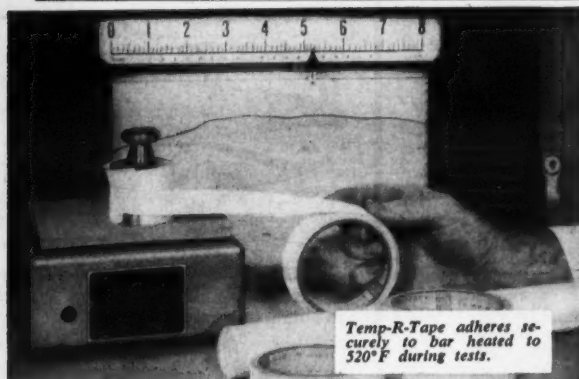
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NEW LITERATURE

Utility pumps with positive displacement are covered in eight-page, well-illustrated brochure. Tables detail dimensions and performance data. Cat CP-3489—Continental Pump Co., 1027 S. Vandeventer, St. Louis 10, Mo.

Check 2595 opposite last page.

Millivoltmeter-application information is covered in 28-page catalog including specifications and features on control and non-control models. Cat C10-1—Industrial Division, Minneapolis-Honeywell Regulator Company, Wayne and Windrim Avenues, Philadelphia 44, Pennsylvania.

Check 2596 opposite last page.

Polyester-glass laminates are classified in four-page bulletin, incorporating suggested applications. Polyester-glass Laminate Bul—Continental-Diamond Fibre Corporation, Subsidiary of The Budd Company, Newark, Del.

Check 2597 opposite last page.

Smelting-refining process is reported in 16-page brochure. Simple technique for electric-furnace smelting and subsequent refining of almost any type of iron ore by Strategic-Udy process is outlined in Smelting-refining Brochure—Engineering and Construction Division, Koppers Company, Inc., 1124 Koppers Building, Pittsburgh 19, Pennsylvania.

Check 2598 opposite last page.

High Copper alloy is analyzed in eight-page booklet describing various forms, tempers, and properties, as well as composition and typical uses. "Phosnic Bronze"—Chase Brass & Copper Co., Waterbury 20, Conn.

Check 2599 opposite last page.

Insecticide and fumigant information, on history, use, and hazards, is incorporated into four-page Bul 591—Acme Protection Equipment Co., 1201 Kalamazoo St., South Haven, Mich.

Check 2600 opposite last page.

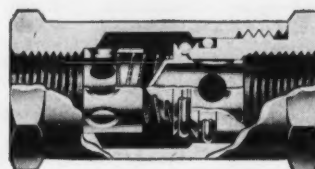
Heaters are referenced in 24-page bulletin, including selection tables, charts, and pipe diagrams. Bul 304.4K1—Industrial Division, American Radiator & Standard Sanitary Corporation, 8111 Tireman Ave., Detroit 32, Mich.

Check 2601 opposite last page.

Minimum pallet standards are spelled out in detail in Minimum Standard Specifications Pamphlet—National Wooden Pallet Manufacturers Association, 609 Barr Building, Washington 6, D.C.

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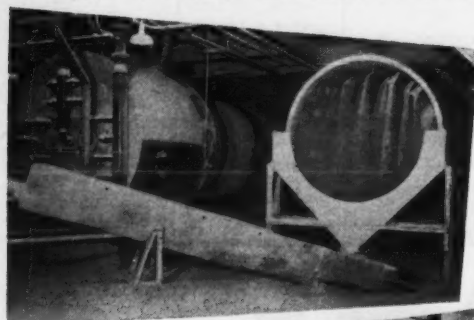
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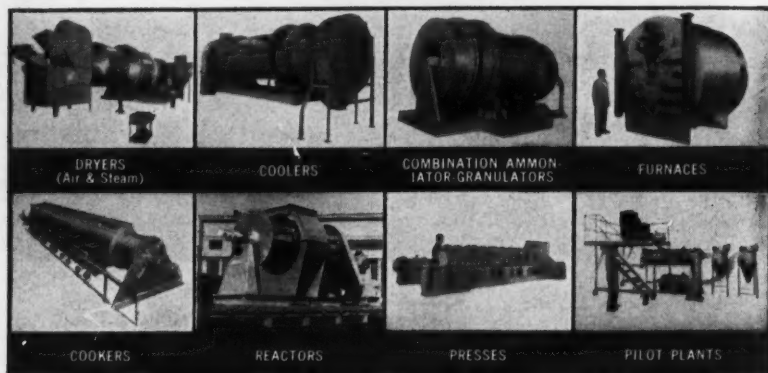
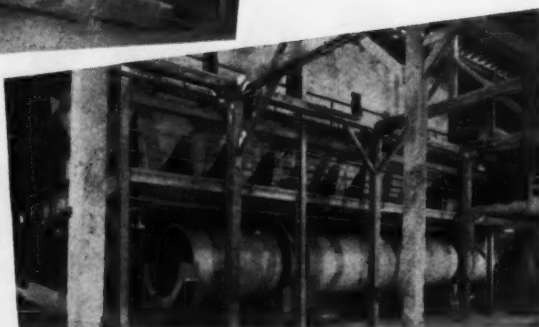
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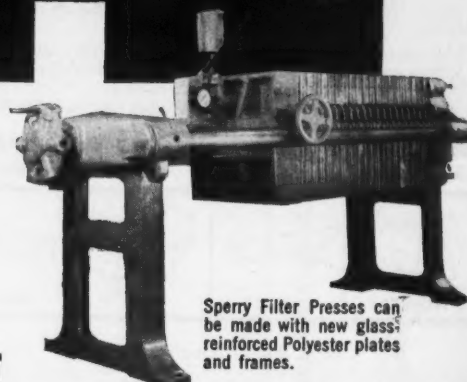
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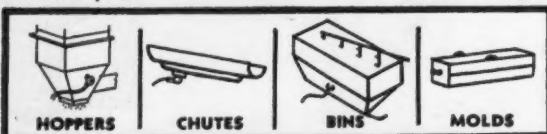
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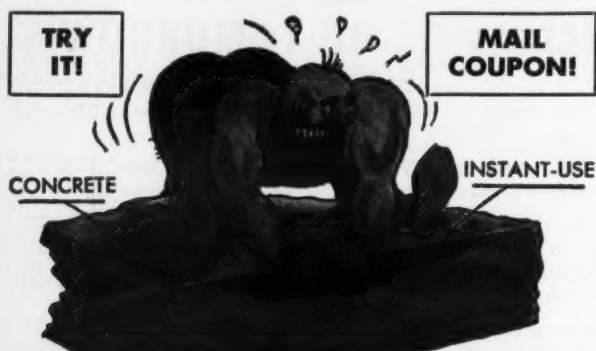
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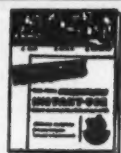
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Check 2608 opposite last page

NEW LITERATURE

From page 202

Molybdenum-hexacarbonyl properties are outlined in Molybdenum Hexacarbonyl Bul — Climax Molybdenum Company, Division of American Metal Climax, Inc., 500 Fifth Ave., New York 36, New York.

Check 2609 opposite last page.

Textile-dyeing methods are discussed in a booklet. General description, classification of dye-stuffs, and dyeing of various fibers with specific classes of dyestuffs are covered in Textile-dyeing Booklet — National Aniline Division, Allied Chemical Corporation, 40 Rector St., New York 6, New York.

Check 2610 opposite last page.

Butenediol properties and types of reactions in which it can take part are tabulated in Bul A-109 — Commercial Development Department, General Aniline & Film Corporation, 435 Hudson St., New York 14, N. Y.

Check 2611 opposite last page.

Wheel-mounted conveyors, of belt, wood apron, stacker, and bucket-loader types, are pictured in 32-page booklet. Units can be furnished with electric-motor or gasoline-engine drive. Cat 102—J. C. Corrigan Co., Inc., 41 Norwood St., Boston 22, Mass.

Check 2612 opposite last page.

Colloidal silica solution is detailed in tech bul incorporating application information, recommended solutions, measuring methods, and general handling information. Syton P Tech Bul—Inorganic Chemicals Division, Monsanto Chemical Company, 800 N. Lindbergh Blvd., St. Louis 66, Mo.

Check 2613 opposite last page.

Particulate matter analysis is covered in seven-page technical paper, "Investigations to Detect the Atmospheric Conversion of Sulfur Dioxide to Sulfur Trioxide", originally presented by Dr. Albert Chaney at meeting of the American Petroleum Institute's Division of Refining in Los Angeles. Particulate Matter Paper — Cahn Instrument Company, 14511 Paramount Blvd., Paramount, Calif.

Check 2614 opposite last page.

Diocetyl sebacate is described in three-page bulletin, including discussion of characteristics and property tables. Product Bul 116 — Harchem Division, Wallace & Tiernan Inc., 25 Main St., Belleville 9, N. J.

Check 2615 opposite last page.

Continued on back cover

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NEW LITERATURE

From page 206

Alkyl chlorides are reviewed in 12-page bulletin, including detailed discussions of all aspects of their properties. Alkyl Chlorides Bul — Union Carbide Chemicals Company, Division of Union Carbide Corporation, 30 E. 42nd St., New York 17, N. Y.

Check 2618 opposite last page.

Pump theory, design of rotary and centrifugal-types are discussed in 26-page booklet. Results of a series of seminars is basic of Pump Theory and Design Booklet —Standard Pump Sales Division, Check 2619 opposite last page.

Radiochemical laboratory of stainless steel, exhibited during conference on peaceful uses of atomic energy in Geneva, Switzerland, is described in four-page folder. Detail drawings of each of the items used in laboratory are provided with Radiochemical Laboratory Folder — S. Blickman, Inc., 8400 Gregory Ave., Weehawken, N.J.

Check 2620 opposite last page.

Welding equipment and industrial regulators are considered in 24-page brochure. Design features of oxy-acetylene welding and cutting equipment and industrial regulators produced by 19 manufacturers are included in Welding Equipment and Industrial Regulator Survey—Modern Engineering Company, 3411 Pine Blvd., St. Louis 3, Mo.

Check 2621 opposite last page.

Engineered conveyors of many types are subject of 48-page catalog. Includes elevators, tubular conveyors, steel-belt conveyors, parts feeders, vibrators and vibrating conveyors, other custom-built equipment. Cat 600—Prab Conveyors, Inc., 30121 Groesbeck Hwy., Roseville, Mich.

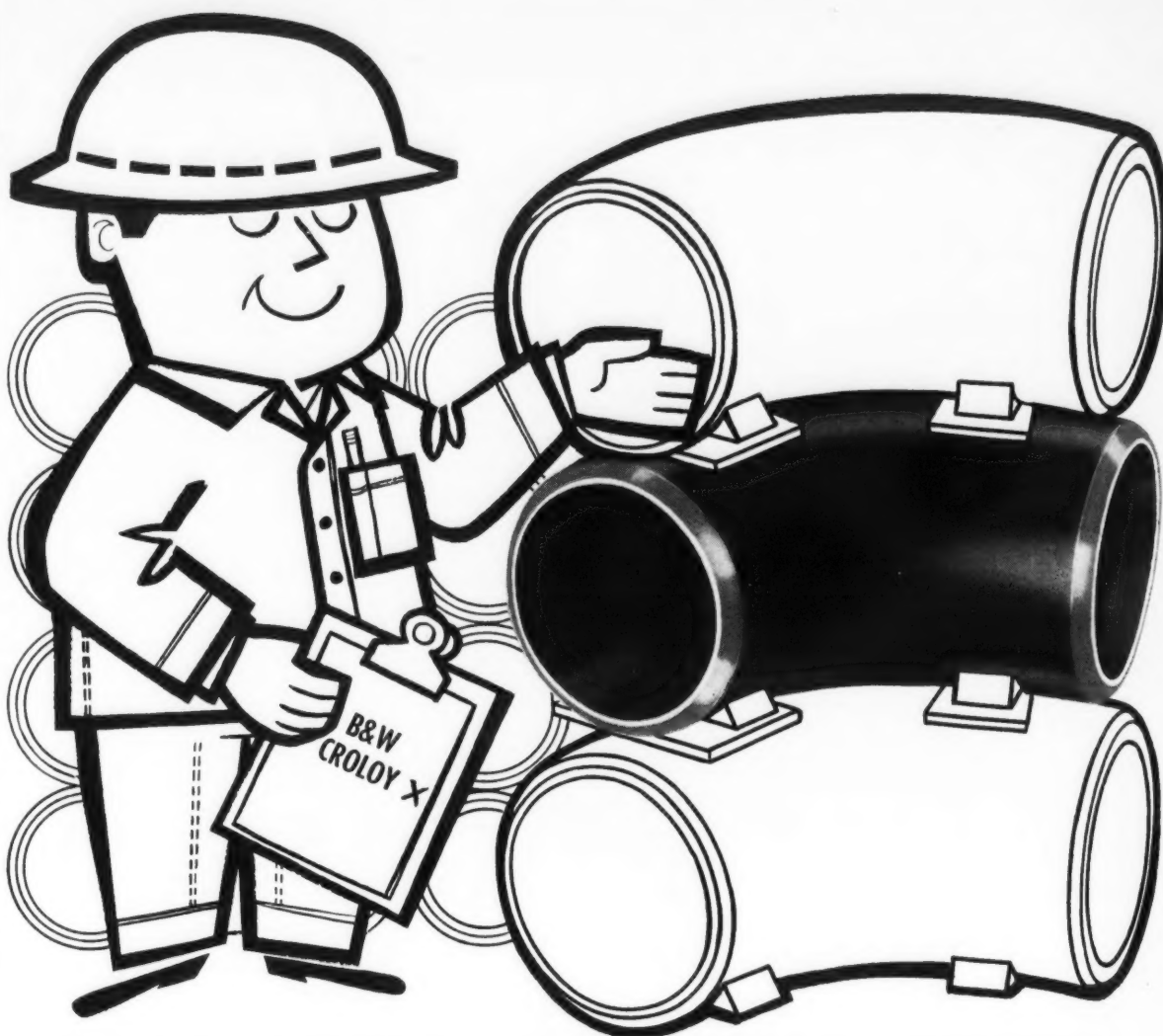
Check 2622 opposite last page.

Soldering of aluminum is subject of 24-page pamphlet. Data on soldering fluxes, irons and flames, and information on various methods such as hot plate, dip, furnace, friction, glass fiber brush, and ultrasonic, are included in "Soldering Aluminum"—Reynolds Metals Company, Box 2346, Richmond 18, Va.

Check 2623 opposite last page.

Laboratory apparatus of polyethylene and polypropylene is outlined in 24-page Cat H459—The Nalge Company, Inc., Box 365, Rochester 2, N.Y.

Check 2624 opposite last page.



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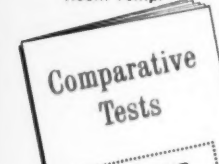
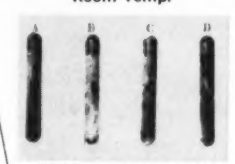
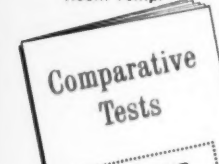
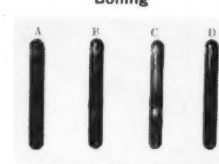
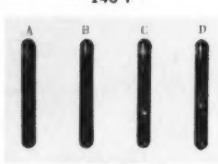
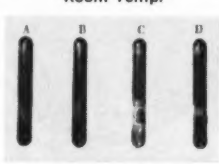
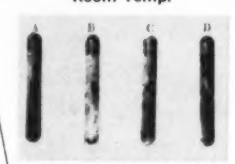
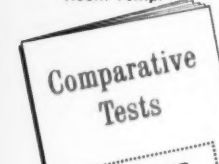
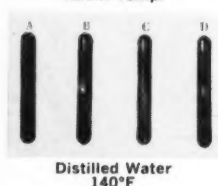
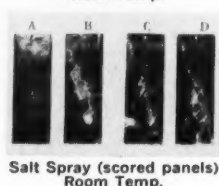
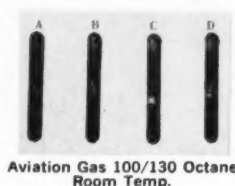
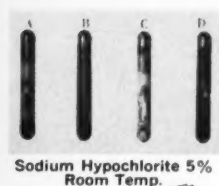
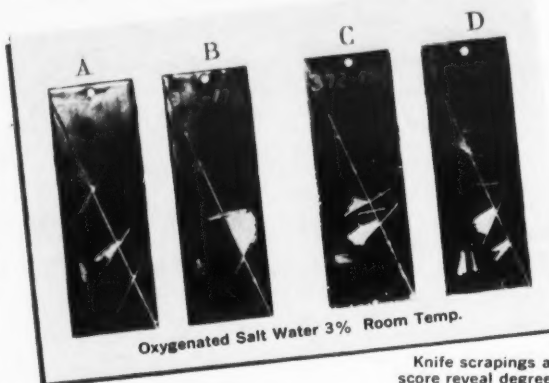
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